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MARCH 1994

REPORT NO. 94-05

ENHANCED PALLETIZED FLATRACK (EPF) TRANSPORTABILITY TESTING ON THE PALLETIZED LOADING SYSTEM (PLS) TRUCK/TRAILER

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Prepared for:
U.S. Army Tank-Automotive Command
ATTN: SFAE-CS-TVH
Warren, MI 48397-5000

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SAVANNA, ILLINOIS 61074-9639

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The U.S. Army Defense Ammunition Center and School (USADACS), Validation Engineering Division (SMCAC-DEV), was tasked by the U.S. Army Tank-Automotive Command, Program Manager for Heavy Tactical Vehicles (SFAE-CS-TVH), to test the Enhanced Palletized Flatrack (EPF) on the Palletized Loading System (PLS) with ammunition loads for compliance with Transportability Testing Procedures, TP-91-01, July 1991. Testing included Container-on-flatcar (COFC), Trailer-on-flatcar (TOFC), loaded PLS truck with EPF cabled on a flatcar, loaded PLS truck/trailer cabled on a flatcar, road hazard course, road trip, washboard, and Shipboard Transportation Simulator (STS) of four different ammunition loads. Minor mechanical discrepancies were observed in the EPF; however, problems did not hinder successful transportation of the ammunition loads. Although the EPF satisfied basic ammunition transportation test criteria, the wooden deck contained 1/8- to 1/2-inch gaps which do not (continued)

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19. ABSTRACT (continued)
meet the tight floor requirements of Code of Federal Regulations (CFR) 177.835(f). As a result, the EPF (as designed) cannot be used for the transportation of ammunition until this floor requirement is met.

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VALIDATION ENGINEERING DIVISION
SAVANNA, IL 61074-9639

REPORT NO. 94-05

ENHANCED PALLETIZED FLATRACK (EPF) TRANSPORTABILITY TESTING ON THE PALLETIZED LOADING SYSTEM (PLS) TRUCK/TRAILER

MARCH 1994

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PART 1

INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center and School (USADACS), Validation Engineering Division (SMCAC-DEV), was tasked by the U.S. Army Tank-Automotive Command, Program Manager for Heavy Tactical Vehicles (SFAE-CS-TVH), to test the Enhanced Palletized Flatrack (EPF) on the Palletized Loading System (PLS) truck and the PLS truck/trailer with ammunition loads for compliance with Transportability Testing Procedures, TP-91-01, July 1991.

B. AUTHORITY. These tests were conducted IAW mission responsibilities delegated by U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, IL 61299-5000. Reference is made to Change 4, 4 October 1974, to AR 740-1, 23 April 1971, Storage and Supply Operations; AMCCOMR 10-17, 13 January 1986, Mission and Major Functions of U.S. Army Defense Ammunition Center and School (USADACS).

C. OBJECTIVE. The objective of these tests is to validate the design criteria of the EPF for the transportation of ammunition in all modes, including the newly fielded PLS truck/trailer. Rail impact tests were conducted with various types of ammunition loaded on the EPF transported on a Container-on-flatcar (COFC) railcar, Trailer-on-flatcar (TOFC) railcar, PLS truck on standard flatcar, and PLS trailer on standard flatcar. Test loads on the EPF also traversed the road hazard course and were subjected to the Shipboard Transportation Simulator (STS).

D. CONCLUSIONS AND RECOMMENDATIONS. Basically, the EPF offered good load support through the testing cycle. There are, however, several design deficiencies on the EPF. These deficiencies are as follows:

1. Wooden pallet decks are recessed 1/2-inch below the outside rail of the EPF. When loading pallets with their skids lateral to the EPF, the pallet skids rest on the outside rail and span over the deck such that the end of the skids supports the bulk of the pallet weight. As a result of the lack of uniform skid support, pallet wooden ends break and metal pallet skids deform. The EPF deck should be level from side rail to side rail.

2. When loading or unloading low center of gravity (CG) loads; i.e., 155mm Separate Loading Projectiles (SLPs), it was noted that the ISO corner fittings cut into the loading/unloading surface after the EPF rollers made initial contact with the loading/unloading surface. This was attributed to the position of the EPF rollers in relation to the outside corner of the ISO fittings and possibly the hardness of the plastic rollers. The heavy load compressed the rollers which effectively reduced the clearance between the corner fitting and the loading/ unloading surface.

3. The weight of the end walls prevented them from being raised from the stowed position. A forklift was required to position them prior to pinning the end walls in an upright position. The spring assist did not function properly, or was not adjusted properly at the factory. Spring assist is constructed to operate only in one direction. Since the end walls fold in both directions, they should be spring assisted to reduce the lifting load in both directions.

4. During testing, the end wall locking pins retracted out of the sockets. This is a potential safety hazard as the end wall could fall off while a load is in transit. The end wall locking devices should have a more positive locking device to prevent extraction while the EPF is in transit.

5. The bail bar end wall has several degrees of rotational movement between the load and end wall when lifting the EPF onto the PLS truck. This movement yields approximately two to

three inches at the top of the wall and prevents the EPF from fully engaging the frame locks on the truck. Tolerances need to be reduced on the locking pins and related assemblies to reduce this rotational movement.

6. The pallet roller axle assemblies are designed to be aligned under the rear edge of the pallet. If the roller position could be shifted further to the rear of the pallet so that the roller axle aligns along the end of the pallet, more clearance between the rear ISO fittings and the ground could be achieved.

7. The trailer bumper plate on the PLS truck used in testing the EPF interfered with the cross ribs on the EPF. Several loading/unloading cycles distorted the plate to the point where the load handling system (LHS) could not unload an EPF. The solution was to remove the bumper. Tolerances on the bumper and the EPF should be checked for interference. Possibly, the height of the bumper plate could be reduced to allow greater clearance between the top of the plate and the flatrack.

8. The bail bar end of the EPF has two fixed pins acting as hinges. The hinge pins are restricted from movement by a nut and bolt assembly positioned in a retractor hole. This assembly became loose and allowed the pins to come out during testing. The pins should be welded in place to prevent removal. This will also eliminate the cost of another assembly in the EPF.

9. Each EPF end wall has built in, recessed tiedown fittings. These fittings are restrained by a metal bar which prevents them from protruding when not being used. In a course of normal transpo.taion, these fittings bounce outside of the recessed housing and rest on the metal restraint bar. As a result, the fittings interfere with loading/unloading operations and could damage the flatrack or be damaged when the end walls are lowered for retrograde.

10. An EPF cannot have its cargo loaded/unloaded with the truck crane. The EPF end wall height restricts the ability of the crane boom to descend lower than 30 degrees to the horizontal. This angle precludes unloading any pallets off the end of the truck. This is a system specification requirement. The height of the end wall could be lowered 14 inches, reducing the crane interference area.

11. Sideboards cannot effectively be used with the EPF since ammunition loads extend laterally from side rail to side rail. Some loads may fall a few inches within the side rails; however, there is not enough clearance between the load and and sideboards for the tiedown devices.

12. The wooden planking used for flooring on the EPF does not fit tight against the longitudinal side rails. Gaps were observed between the wood and side rails varying from 1/8- to 1/2-inch. The gaps provide an unobstructed view from the top of the EPF to the ground below and vice versa. This manufacturing oversight prevents the EPF from being used to ship ammunition over public highways. This is IAW CFR section 177.835(f). The key phrase is "... Motor Vehicles transporting Division 1.1, 1.2, or 1.3 (Class A or Class B explosive) materials shall have tight floors ..." Additional criteria for inspection of intermodal containers is given in MIL-HDBK-138, Container Inspection Handbook for Commercial and Military Intermodal Containers. Both documents require a tightly-sealed floor to offer protection from road debris being thrown into the load during transportation. On this basis, the EPF cannot be used for transporting ammunition.

PART 2

14-16 NOVEMBER 1994

ATTENDEES

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KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF ONE TO THREE LOOSE BOXES). INSTALL EACH STRAP TO ENCIRCLE ALL BOXES IN THE BUNDLE. PREPOSITION THESE TWO STRAPS ON THE FLOOR OF THE FLATRACK, IN LINE WITH THE TIEDOWN ANCHORS TO BE USED, PRIOR TO LOADING THE BOXES. MAKE SURE THE STRAPS LAY FLAT ACROSS THE FLOOR, WITH THE RATCHET HANDLE FACING DOWN, AND DRAPE THE ENDS OVER THE SIDE OF THE FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. POSITION BOXES ON THE FLOOR AND CENTERED OVER TOP OF BOTH STRAPS. WHILE HOLDING BOXES IN POSITION, BRING EACH END OF STRAP UP, CROSS ENDS OVER TOP OF BUNDLE, AND ATTACH ENDS OF STRAP TO TIEDOWN ANCHORS ON OPPOSITE SIDES OF THE FLATRACK, TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE BOXES, IF NECESSARY, SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

② WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF FOUR OR MORE LOOSE BOXES). INSTALL EACH STRAP TO ENCIRCLE ALL BOXES IN THE BUNDLE AT THE APPROXIMATE LOCATION SHOWN. PRE-POSITION THESE TWO STRAPS ON THE FLOOR OF THE FLATRACK PRIOR TO LOADING THE BOXES. MAKE SURE STRAPS LAY FLAT ACROSS THE FLOOR AND DRAPE THE ENDS OVER THE SIDE OF THE FLATRACK. POSITION THE FIRST LAYER OF BOXES ON THE FLOOR AND ON TOP OF THE STRAPS. KEEP THE BOTTOM LAYER OF BOXES TIGHT AGAINST EACH OTHER AND STACK THE REMAINING BOXES IN LAYERS ON TOP OF THE BOTTOM LAYER. AFTER ALL BOXES ARE STACKED, HOOK ENDS OF EACH STRAP MARKED ② TOGETHER AND POSITION ON TOP OF BUNDLE. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE BOXES, IF NECESSARY, SO THEY FORM A COMPACT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF FOUR OR MORE LOOSE BOXES). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK OVER TOP OF BOXES TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. ATTACH WEB STRAP TIEDOWN ASSEMBLIES, MARKED ④ TO THE SAME TIEDOWN ANCHORS PRIOR TO RATCHETING STRAPS MARKED ③ TIGHT. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS MARKED ③ AT THE SAME TIME. NOTE: THE BOXES SHOULD BE POSITIONED SO STRAPS MARKED ③ WILL GO STRAIGHT OVER THE TOP OF THE BUNDLE. SEE SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

④ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF FOUR OR MORE LOOSE BOXES). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF BUNDLED BOXES AT THE LOCATION SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. IF THESE STRAPS ARE BEING ATTACHED TO THE SAME TIEDOWN ANCHORS AS STRAPS MARKED ③, ATTACH RATCHET ENDS TO THE SAME TIEDOWN ANCHORS THAT THE NON-RATCHET ENDS OF STRAPS MARKED ③ ARE ATTACHED TO. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT. SEE GENERAL NOTES "F", "G" AND "N" ON PAGE 2.

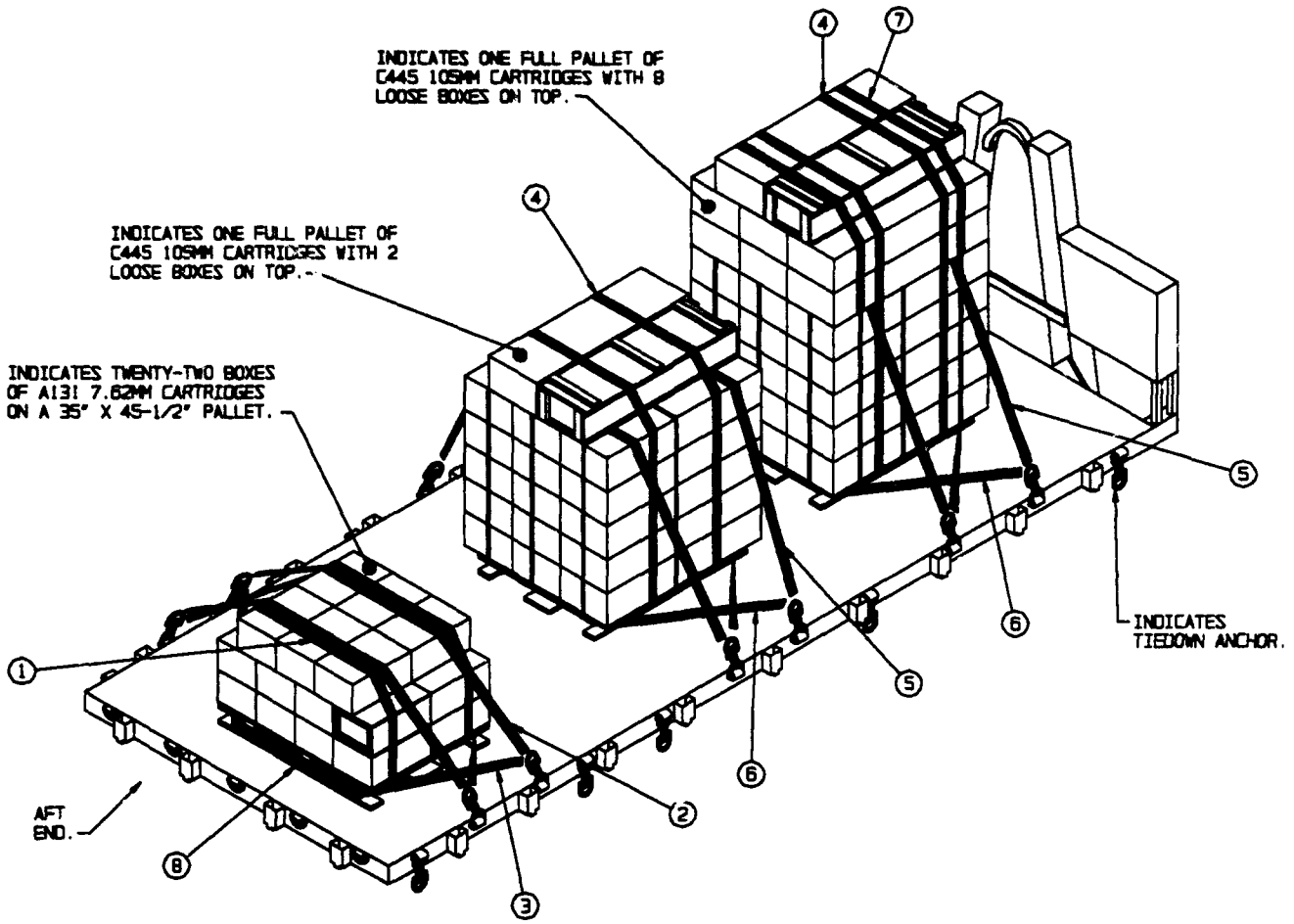
⑤ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH STACK OF FOUR OR MORE LOOSE BOXES). INSTALL EACH STRAP TO ENCIRCLE ALL BOXES IN THE STACK AT THE APPROXIMATE LOCATION SHOWN. PRE-POSITION THESE TWO STRAPS ON THE FLOOR OF THE FLATRACK PRIOR TO LOADING BOXES. MAKE SURE STRAPS LAY FLAT ACROSS THE FLOOR AND DRAPE ENDS OVER SIDE OF FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. POSITION THE FIRST LAYER OF BOXES ON THE FLOOR AND ON TOP OF THE STRAPS. KEEP THE BOTTOM LAYER OF BOXES TIGHT AGAINST EACH OTHER AND STACK REMAINING BOXES IN LAYERS ON TOP OF THE BOTTOM LAYER. AFTER ALL BOXES ARE STACKED, HOOK ENDS OF EACH STRAP MARKED ⑤ TOGETHER AND POSITION ON TOP OF BUNDLE. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE BOXES, IF NECESSARY, SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

(CONTINUED AT RIGHT)

(KEY NUMBERS CONTINUED)

⑥ WEB STRAP TIEDOWN ASSEMBLY (ONE REQUIRED FOR EACH STACK OF FOUR OR MORE LOOSE BOXES). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF BOXES, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH STRAP RATCHETS ON SAME SIDE OF FLATRACK. ATTACH WEB STRAP TIEDOWN ASSEMBLIES MARKED ⑦ TO THE SAME TIEDOWN ANCHORS PRIOR TO RATCHETING STRAPS MARKED ⑥ TIGHT. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS MARKED ⑥ AT THE SAME TIME. NOTE: THE BOXES SHOULD BE POSITIONED SO STRAPS MARKED ⑥ WILL GO STRAIGHT OVER THE TOP OF THE BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑦ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH STACK OF FOUR OR MORE LOOSE BOXES). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF BUNDLED BOXES AT LOCATION SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. IF THESE STRAPS ARE BEING ATTACHED TO THE SAME TIEDOWN ANCHOR AS STRAPS MARKED ⑥, ATTACH RATCHET ENDS TO THE SAME TIEDOWN ANCHORS THAT THE NON-RATCHET ENDS OF STRAPS MARKED ⑥ ARE ATTACHED TO. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F", "G" AND "N" ON PAGE 2.



ISOMETRIC VIEW

SPECIAL NOTES:

1. TYPICAL METHODS OF SECURING LOOSE BOXES ON TOP OF A PALLET UNIT AND/OR 35" X 45-1/2" PALLET ARE SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. THE PROCEDURES FOR SECURING LOOSE 7.62MM OR 105MM CARTRIDGES IN WOODEN BOXES SHOWN ON THIS PAGE MAY ALSO BE USED ON THE M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE 105MM CARTRIDGE, PACKED TWO PER WOODEN BOX HAVING DIMENSIONS OF 45-3/4" LONG BY 14-1/4" WIDE BY 8-3/4" HIGH AND THE 7.62MM CARTRIDGE PACKED 800 PER WOODEN BOX AND HAVING DIMENSIONS OF 17-1/2" LONG BY 11-1/2" WIDE BY 8-1/8" HIGH, ARE SHOWN. THESE PROCEDURES MAY BE USED FOR BOXES OF DIFFERENT SIZES AND WEIGHTS.

4. THE QUANTITY OF BOXES POSITIONED ON A 35" X 45-1/2" PALLET AND/OR ON TOP OF A PALLET UNIT IS LIMITED TO THE QUANTITY THAT CAN BE ENCIRCLED WITH ONE WEB STRAP TIEDOWN ASSEMBLY, SHOWN AS KEY NUMBERS ① AND ⑦ ABOVE.

5. FOR ALTERNATIVE METHODS OF SECURING LOOSE BOXES, SEE PAGES 38 AND 39.

6. A 35" X 45-1/2" PALLET IS SHOWN, HOWEVER, PALLETS OF OTHER DIMENSIONS MAY BE USED.

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO ENCIRCLE ALL BOXES AND TOP DECK OF THE PALLET MARKED ①. PRIOR TO POSITIONING BOXES ON PALLET, THREAD STRAPS MARKED ① UNDER THE TOP DECK OF PALLET WITH BOTH RATCHET ENDS ON THE SAME SIDE OF PALLET. MAKE SURE THE STRAPS LAY FLAT WITH NO TWISTS IN THEM. AFTER THE BOXES ARE POSITIONED ON THE PALLET, BRING ENDS OF STRAP UP OVER TOP OF BOXES AND HOOK ENDS OF STRAP TOGETHER. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

② WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK OVER TOP OF BOXES TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE LOAD. ATTACH WEB STRAP TIEDOWN ASSEMBLIES MARKED ② TO THE SAME TIEDOWN ANCHORS PRIOR TO RATCHETING STRAPS MARKED ② TIGHT. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS MARKED ② AT THE SAME TIME. NOTE: THE BOXES SHOULD BE POSITIONED SO STRAPS MARKED ② WILL GO STRAIGHT OVER THE TOP OF THE BUNDLE. SEE GENERAL NOTES "F", "G" AND "N" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PALLET AT LOCATION SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. IF THESE STRAPS ARE BEING ATTACHED TO THE SAME TIEDOWN ANCHORS AS STRAPS MARKED ②, ATTACH RATCHET ENDS TO THE SAME TIEDOWN ANCHORS THAT THE NON-RATCHET ENDS OF STRAPS MARKED ② ARE ATTACHED TO. TAKE UP SLACK IN STRAPS MAND THEN RATCHET TIGHT. SEE SEE GENERAL NOTES "F" , "G" AND "N" ON PAGE 2.

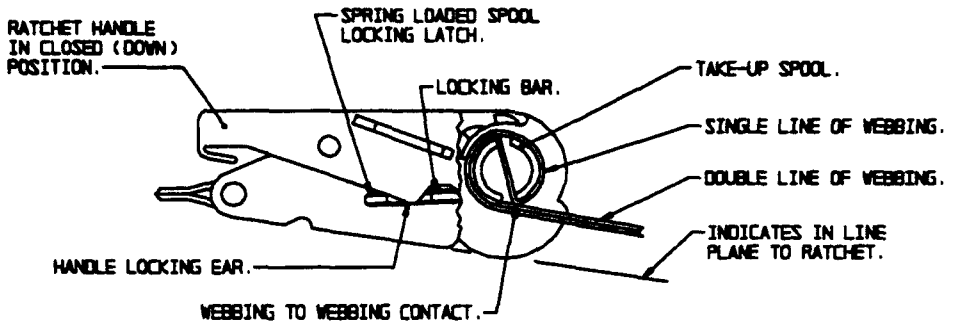
④ WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO ENCIRCLE PALLETIZED UNIT AND ALL LOOSE BOXES POSITIONED ON TOP OF THE PALLETIZED UNIT. PRIOR TO POSITIONING LOOSE BOXES ON THE PALLETIZED UNIT, THREAD STRAPS MARKED ④ UNDER THE TOP DECK OF THE PALLET WITH BOTH RATCHET ENDS ON THE SAME SIDE OF THE PALLET. MAKE SURE THAT THE STRAPS LAY FLAT WITH NO TWISTS IN THEM. POSITION THE BOXES ON TOP OF THE PALLET UNIT, BRING ENDS OF STRAPS UP OVER TOP OF LOOSE BOXES AND HOOK ENDS OF STRAP TOGETHER. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. NOTE: AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE BOXES SO THEY FORM A TIGHT BUNDLE ON TOP OF THE PALLETIZED UNIT. SINCE THE BOXES MAY SEEK THEIR NATURAL POSITION DURING TRANSPORT, CHECK STRAPS FOR TIGHTNESS AND RE-TIGHTEN IF NECESSARY. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑤ WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLETIZED UNIT, UNDER ALL LOOSE BOXES WHICH ARE POSITIONED ON TOP OF THE PALLETIZED UNIT, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. NOTE: STRAPS MARKED ⑤ MUST BE INSTALLED OVER TOP OF THE PALLETIZED UNIT PRIOR TO POSITIONING THE LOOSE BOXES ON TOP OF THE PALLETIZED UNIT. TAKE UP EXCESS SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑥ WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PALLET AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAP AND RATCHET TIGHT. SEE GENERAL NOTES "F", "G" AND "N" ON PAGE 2.

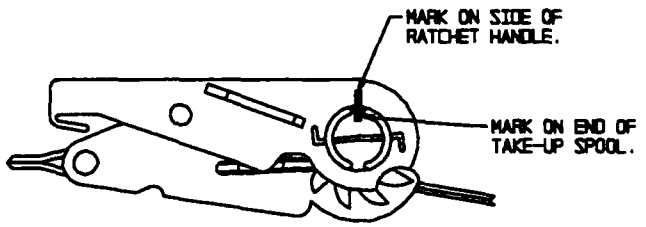
⑦ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO ENCIRCLE ALL BOXES IN THE BUNDLE AT THE APPROXIMATE LOCATION SHOWN. PREPOSITION THESE TWO STRAPS ON TOP OF THE PALLETIZED UNIT PRIOR TO LOADING BOXES. MAKE SURE STRAPS LAY FLAT AND DRAPE THE ENDS OVER THE SIDE OF THE PALLETIZED UNIT. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE PALLETIZED UNIT. POSITION THE FIRST LAYER OF BOXES ON TOP OF THE PALLETIZED UNIT. KEEP THE BOTTOM LAYER OF BOXES TIGHT AGAINST EACH OTHER AND STACK THE REMAINING BOXES ON TOP OF THE BOTTOM LAYER. AFTER ALL BOXES ARE STACKED, HOOK ENDS OF STRAPS MARKED ⑦ TOGETHER AND POSITION ON TOP OF BUNDLE. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE BOXES, IF NECESSARY, SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑧ WOOD PALLET, 35" X 45-1/2" (1 REQD). SEE KEY NUMBER ① ON THIS PAGE.



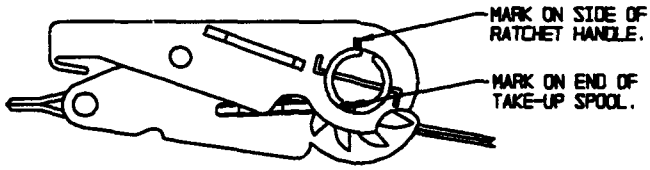
STEP 1

IN THIS VIEW PART OF THE RATCHET HOUSING IS SHOWN BROKEN AWAY TO DEPICT WEBBING-TO-WEBBING CONTACT ON THE TAKE-UP SPOOL OF THE RATCHET. WEBBING-TO-WEBBING CONTACT IS ACHIEVED WHEN THE OPERATOR HOLDS THE DOUBLE LINE OF WEBBING IN AN "IN LINE PLANE TO THE RATCHET" AND IT MAKES CONTACT WITH THE SINGLE LINE OF WEBBING.



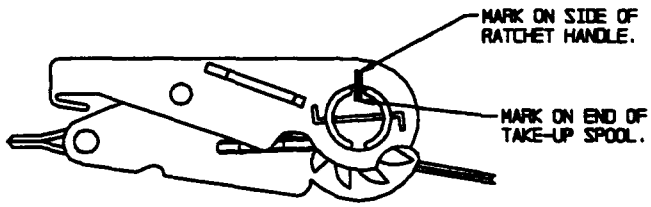
STEP 2

THIS VIEW DEPICTS THE LOCATION OF THE FIXED MARK ON THE RATCHETING HANDLE, WITH ANOTHER MATCHING MARK ON THE TAKE-UP SPOOL, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE.



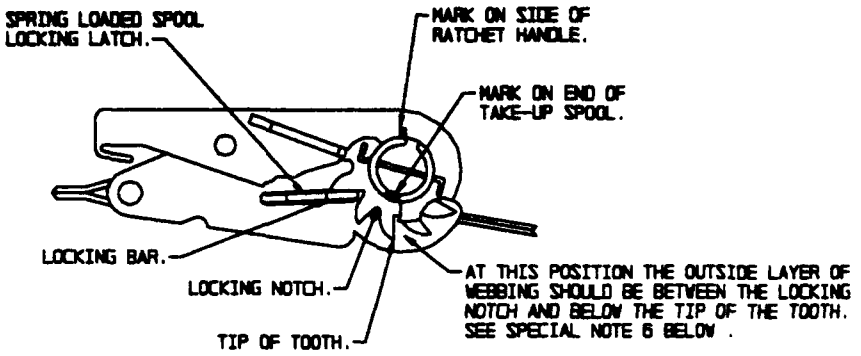
STEP 3

THIS VIEW DEPICTS THE LOCATION OF THE MARK ON THE END OF THE TAKE-UP SPOOL AFTER THE SPOOL HAS BEEN ROTATED ONE-HALF TURN, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE.



STEP 4

THIS VIEW DEPICTS THE LOCATION OF THE MARK ON THE END OF THE TAKE-UP SPOOL AFTER THE SPOOL HAS BEEN ROTATED ONE FULL TURN, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE.



STEP 5

THIS VIEW DEPICTS THE LOCATION OF THE MARK ON THE END OF THE TAKE-UP SPOOL AFTER THE SPOOL HAS BEEN ROTATED ONE AND ONE-HALF TURNS, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE. ALSO IN THIS VIEW, PART OF THE RATCHET HANDLE IS BROKEN AWAY TO SHOW THE LOCKING BAR FULLY SEATED IN THE MATCHING LOCKING NOTCH (SPROCKET GEAR TEETH).

SPECIAL NOTES:

1. THE PURPOSE OF THE RATCHET DETAILS ON PAGE 42 AND THE DETAIL AND NOTES ON THIS PAGE ARE TO AUGMENT THE GUIDANCE SET FORTH WITHIN GENERAL NOTE "F" ON PAGE 2.

2. THE REQUIREMENTS FOR 1/2 BUT NOT MORE THAN 1-1/2 WRAPS OF STRAP ON THE TAKE-UP SPOOL OF THE TENSIONING RATCHET, AS SPECIFIED WITHIN GENERAL NOTE "F" ON PAGE 2, ACTUALLY MEANS 1/2 TO 1-1/2 WRAPS OF DOUBLE WEBBING. ALSO, THE 1/2 TO 1-1/2 WRAPS (TURNS) ARE TO BE ACCOMPLISHED ONLY AFTER ENOUGH WEBBING HAS BEEN WOUND ONTO THE SPOOL TO ACHIEVE A WEBBING-TO-WEBBING CONTACT CONFIGURATION, AS SHOWN IN THE "STEP 1" DETAIL ON PAGE 42.

3. ONE METHOD THAT CAN BE USED TO ENSURE THAT THE 1/2 TO 1-1/2 WRAPS ARE WOUND ONTO THE TAKE-UP SPOOL, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, IS TO PLACE A FIXED MARK (PAINT OR SIMILAR MATERIAL) ON THE SIDE OF THE RATCHETING HANDLE, WITH THE HANDLE IN ITS CLOSED (DOWN) POSITION, AND ANOTHER SHORT MATCHING MARK ON THE END OF THE SPOOL, AS SHOWN IN THE "STEP 2" DETAIL ON PAGE 42. AS THE SPOOL IS ROTATED TO TENSION A TIEDOWN STRAP ASSEMBLY, THE NUMBER OF WRAPS (TURNS) CAN BE DETERMINED VISUALLY BY COMPARING THE "MARK" LOCATION ON THE SPOOL TO THE "MARK" LOCATION ON THE RATCHETING HANDLE WITH THE HANDLE IN CLOSED POSITION. SEE THE "STEP 3" AND "STEP 4" DETAILS ON PAGE 42, AND "STEP 5" ABOVE.

4. ANOTHER METHOD THAT CAN BE USED TO ENSURE THAT THE 1/2 TO 1-1/2 WRAPS ARE ACHIEVED, AFTER WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, IS TO COUNT THE AUDIBLE CLICKS MADE BY THE RATCHET ASSEMBLY AS A WEB STRAP ASSEMBLY IS BEING TENSIONED. THE RATCHET ASSEMBLY ON MOST WEB STRAP ASSEMBLIES HAS 11 TEETH ON THE GEARLIKE DEVICE ON EACH END OF THE TAKE-UP SPOOL; SOME OTHER STRAP ASSEMBLIES HAVE ONLY 9 TEETH. THEREFORE, AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, ROTATE (TURN) THE SPOOL THROUGH A MINIMUM OF 6 TO A MAXIMUM OF 16 CLICKS (1/2 TO 1-1/2 WRAPS) WHEN THE GEAR HAS 11 TEETH, AND ROTATE (TURN) THE SPOOL THROUGH A MINIMUM OF 5 TO A MAXIMUM OF 13 CLICKS (1/2 TO 1-1/2 WRAPS) IF THE GEAR HAS 9 TEETH.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

5. AFTER A STRAP ASSEMBLY HAS BEEN PROPERLY TENSIONED, CARE MUST BE EXERCISED TO ASSURE THAT THE TAKE-UP SPOOL LOCKING LATCH (SPRING LOADED DEVICE WITH A LOCKING BAR ON EACH SIDE OF THE RATCHET ASSEMBLY) IS FULLY SEATED ON BOTH SIDES IN MATCHING LOCKING NOTCHES, WHICH ARE SIMILAR TO SPROCKET GEAR TEETH, THAT ARE LOCATED ON EACH END OF THE TAKE-UP SPOOL. SEE "STEP 5" DETAIL ABOVE. THE LOCKING LATCH IS "FULLY SEATED" WHEN THE HANDLE WILL CLOSE AND THE LOCKING EAR, OR SIMILAR DEVICE ON THE HANDLE, PREVENTS THE ACCIDENTAL WITHDRAWAL OF THE LOCKING LATCH. SEE "STEP 1" DETAIL ON PAGE 42. IF THE FULLY SEATED CONDITION CANNOT BE ACHIEVED, THE STRAP MUST BE RELEASED AND HAND RETENSIONED AS TIGHT AS POSSIBLE TO ACHIEVE THE FULLY SEATED CONDITION.

6. ANOTHER VISUAL METHOD OF DETERMINING WHEN THERE IS 1/2 TO 1-1/2 WRAPS OF WEBBING ON THE TAKE-UP SPOOL, AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, IS TO LOOK AT THE SPOOL. WHEN A TIEDOWN IS COMPLETE, THE STRAP WEBBING ON THE SPOOL OF THE RATCHET SHOULD BE ABOVE THE LOWER CURVE OF THE LOCKING NOTCH, AND SHOULD BE BELOW THE TIPS OF THE TEETH OF THE RATCHET AS IDENTIFIED IN "STEP 5" ABOVE. IT SHOULD BE NOTED THAT ANY PROCEDURES THAT ENSURE PROPER TENSIONING ARE ACCEPTABLE AND THE METHODS ON THE DRAWING ONLY PROVIDE SOME OF THE APPROVED ACCEPTABLE ONES.

PART 3

TEST PROCEDURES

A. These test procedures are extracted from TP-91-01, Transportability Testing Procedures, July 1991, for validating tactical vehicles and outloading procedures used for shipping munitions by intermodal freight containers, commercial or tactical truck, or trailer or railcar.

B. The test load was prepared using the same blocking and bracing methods specified in the tiedown procedures proposed for use with munitions. A copy of these procedures is contained in part 6 of this report. The EPFs used in these tests were inspected to ensure their adequacy for munitions transport. Items used to build the load were inert (nonexplosive). The weight and physical characteristics of the load configuration were identical to the live (explosive) ammunition provided for in the tiedown procedure; i.e., weights, physical dimensions, center of gravity (CG), materials, etc. The ammunition packages duplicated that of the live ammunition.

C. Tests conducted for this set of load configurations are as follows:

1. Rail Impact - COFC (Test Method No. 1).
2. Rail Impact - TOFC (Test Method No. 1).
3. Hazard Course (Test Method No. 2).
4. Road Trip (test Method No. 3).
5. Hazard Course (Test Method No. 2).
6. Washboard Course (Test Method No. 6).
7. Shipboard Transportation Simulator (STS) (Test Method No. 4).

   Rail Impact - PLS TOFC (Test Method No. 1).

   Rail Impact - PLS on flatcar (Test Method No. 1).
8. Hazard Course (Test Method No. 2).

9. Road Trip (Test Method No. 3).

10. Hazard Course (Test Method No. 2).

11. Washboard Course (Test Method No. 6).

D. The test methods are as follows:

1. Test Method No. 1 (Rail Impact Test). The EPF was loaded on a COFC railcar, a container chassis secured to a stanchion on a TOFC railcar, the PLS truck secured to a flatcar, and the PLS trailer secured to a flatcar. Equipment needed to perform the test included the specimen (hammer) car, five empty railroad cars connected together to serve as an anvil, and a railroad locomotive. These anvil cars were positioned on a level section of track with air and hand brakes set and with the draft gears compressed. The locomotive unit pulled the specimen car several hundred yards away from the anvil cars, and then, pushed the specimen car toward the anvil at a predetermined speed, then disconnected from the specimen car approximately 50 yards away from the anvil cars which allowed the specimen car to roll freely along the track until it struck the anvil. This constituted an impact. Impacting was accomplished at speeds of 4, 6, and 8.1 mph in one direction and at a speed of 8.1 mph in the reverse direction. The 4 and 6 mph impact speeds were approximate; the 8.1 mph speed was a minimum. Impact speeds were determined by using an electronic counter to measure the time for the specimen car to traverse an 11-foot distance immediately prior to contact with the anvil cars (see Figure 1).

2. Test Method No. 2 (Hazard Course). This step required the loaded EPF to be transported over the 200-foot-long segment of concrete-paved road which consisited of two series of railroad ties projecting 6 inches above the level or the road surface. The loaded EPF traversed this course two times.

DEPARTMENT OF THE ARMY
US ARMY DEFENSE AMMUNITION CENTER AND SCHOOL
SAVANNA, ILLINOIS 61074-9639

REPLY TO
ATTENTION OF:

SMCAC-DEV (702-3b)

2 5 AUG 1994

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2. The POC is Mr. A. C. McIntosh, SMCAC-DEV, DSN 585-8989, commercial (815) 273-8989.

FOR THE DIRECTOR:

JEROME H. KROHN
Chief, Validation Engineering Division

Encl
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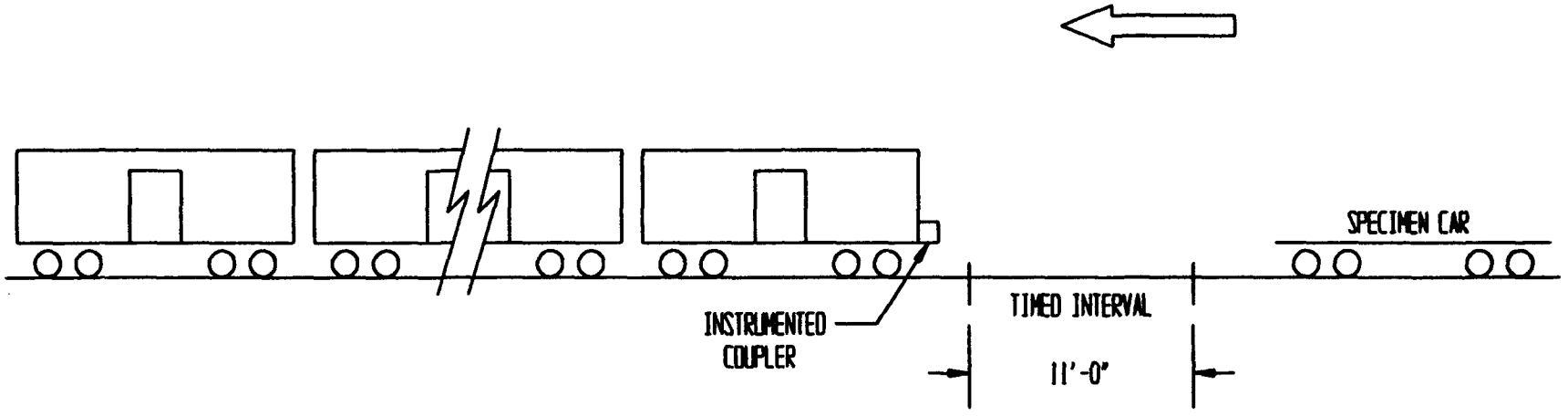
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ASSOCIATION OF AMERICAN RAILROADS (AAR)
STANDARD TEST PLAN



5 BUFFER CARS (ANVIL) WITH DRAFT GEAR COMPRESSED AND AIR BRAKES IN A SET POSITION

ANVIL CARS TOTAL WT 250,000 LBS (APPROX)

SPECIMEN CAR
IS RELEASED BY
SWITCH ENGINE TO

ATTAIN: IMPACT NO. 1 @ 4 MPH
IMPACT NO. 2 @ 6 MPH
IMPACT NO. 3 @ 8.1 MPH

THEN THE CAR IS REVERSED AND RELEASED BY SWITCH ENGINE TO

ATTAIN: IMPACT NO 4. @ 8.1 MPH

FIGURE 1

3. Test Method No. 3 (Road Trip). The loaded EPF was transported for a distance of 30 miles over a combination of roads surfaced with gravel, concrete, or asphalt. The test route included curves, corners, railroad crossings, cattle guards, and stops and starts. The EPF traveled at the maximum speed for the particular road being traversed, except as limited by legal restrictions. Upon completion of the 30-mile road trip, the loaded EPF was subjected to three full airbrake stops while traveling in the forward direction and one in the reverse direction. The first three stops were at 5, 10, and 15 mph, while the stop in the reverse direction was approximately 5 mph.

4. Test Method No. 4 (Shipboard Transportation Simulator [STS]). The EPF was positioned onto the STS and securely locked in place using the cam lock at each ISO corner fitting. The STS started oscillation at an angle of 30 degrees plus or minus 2 degrees, either side of center at a frequency of 2 cycles-per-minute (cpm) (30 seconds plus or minus 2 seconds total roll period). This frequency was observed for apparent defects that could cause a safety hazard. The frequency of oscillation was increased to 4 cpm (15 seconds plus or minus one second roll period) and the apparatus operated for 2 hours. If inspection of the load does not indicate an impending failure, the frequency of oscillation is increased to 5 cpm (12 seconds plus or minus 1 second-cycle-time) and the apparatus operated for 4 hours. The operation does not have to be continuous; however, no change or adjustments to the load or load restraints was permitted at any time during the test. After being set in place, the EPF was not removed from the STS until the test was completed.

5. Test Method No. 6 (Washboard Course). The EPF was driven over the washboard course (see Figure 2) at a speed which produced the most violent response in the EPF.

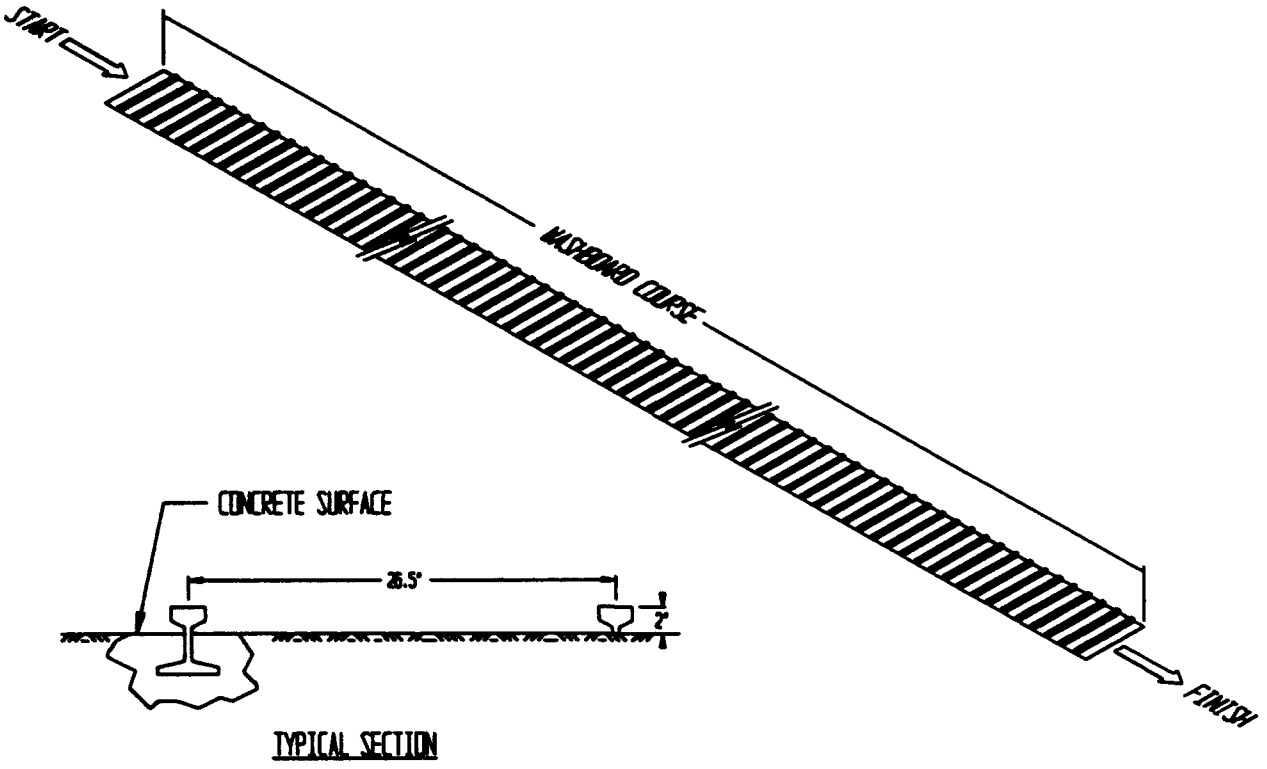

START
WASHBOARD COURSE
FINISH
CONCRETE SURFACE
26.5"
TYPICAL SECTION

FIGURE 2

PART 4

TEST RESULTS

TEST NO. 1

RAIL IMPACT DATA

Test No.: 1 Date: 15-16 November 1993

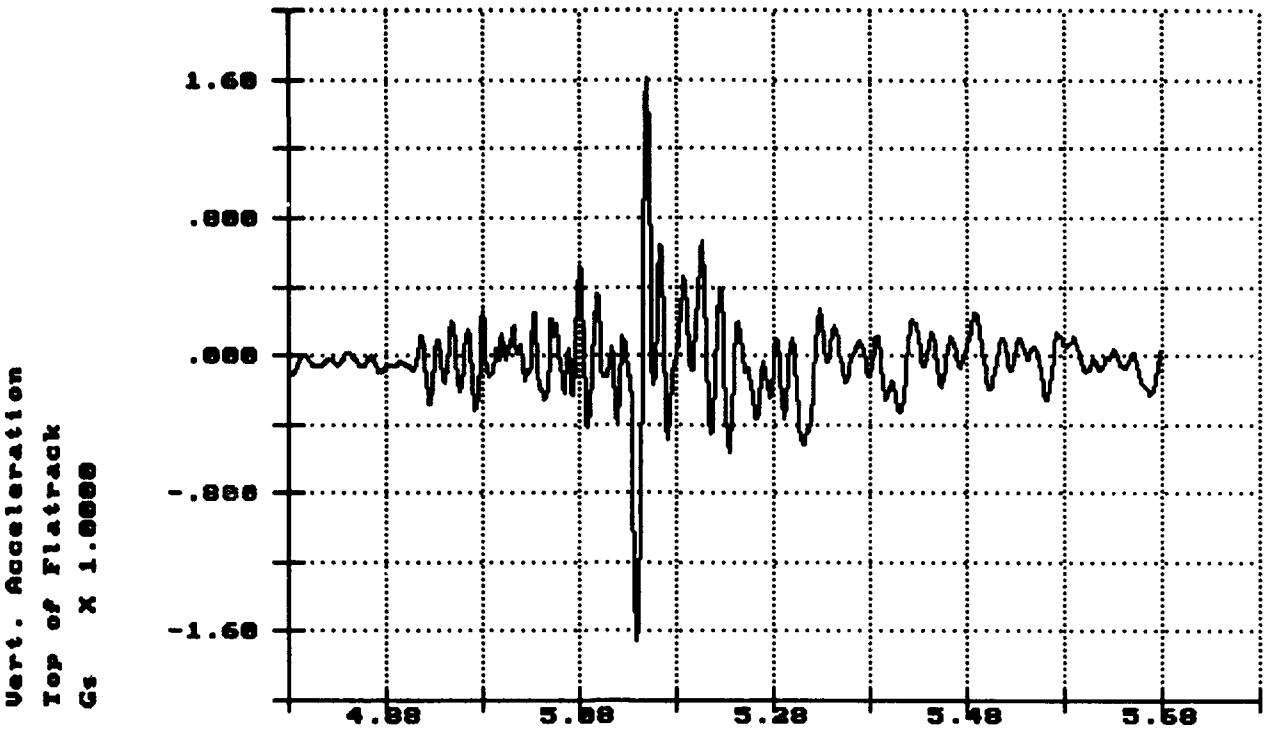
Specimen Loads: Enhanced Palletized Flatracks (EPFs) with 155MM Separate Loading Projectiles (SLPs) and 120MM tank ammunition on metal pallets on a Container-on-flatcar (COFC) railcar.

Flatcar No.: TTWX 975424	Lt. Wt.:	73,000
EPF No. 1	Wt.:	7,500
Lading, 155MM SLPs	Wt.:	28,000
EPF No. 2	Wt.:	7,500
Lading, 120MM Tank Ammunition on Metal Pallets	Wt.	24,000
	Total Specimen Wt.:	140,000
	Buffer Car (five cars) Wt.:	250,000

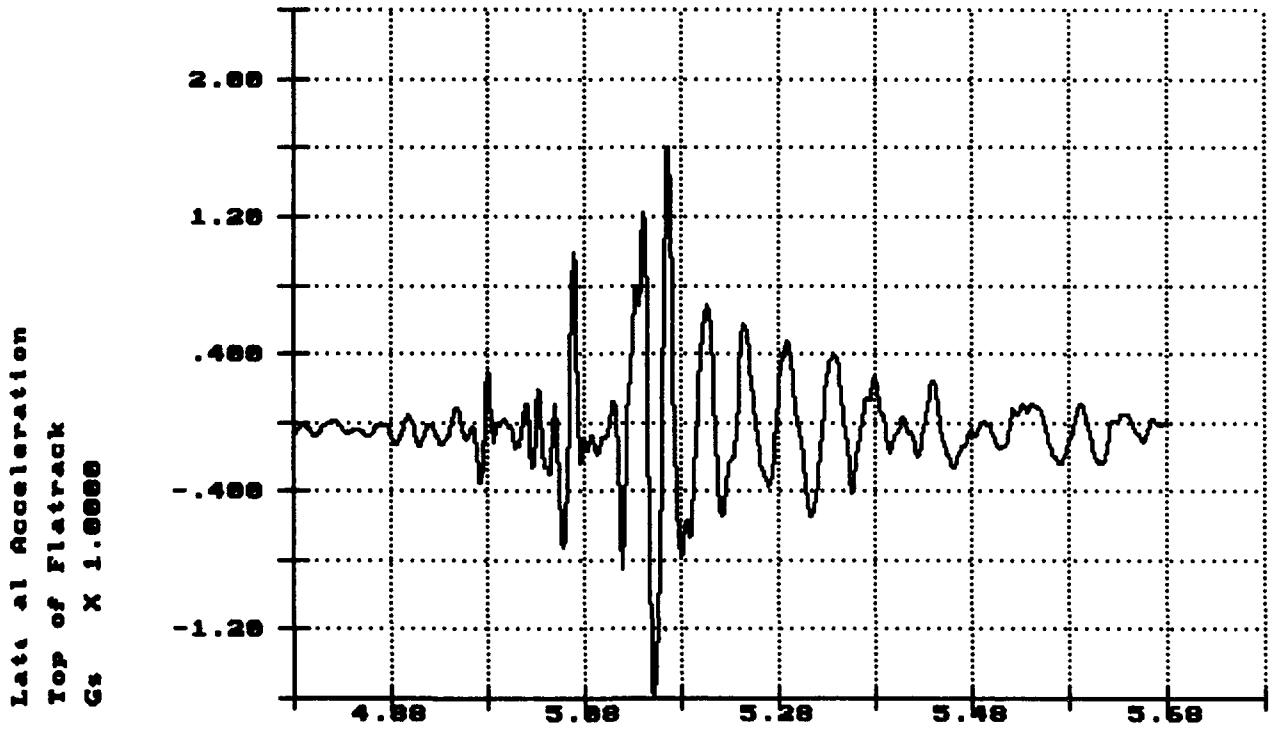
Impact	End Struck	Velocity	Remarks
1	120MM	4.34	No load movement.
2	120MM	6.52	No load movement.
3	120MM	8.93	155MM SLPs moved 3/4-inch from end wall opposite impact. 120MM metal pallets were 1-1/2 inches from end wall at the top of the pallet and 1/2-inch at the bottom of the pallet.
4	155MM	9.38	Both 155MM SLPs and 120MM metal pallets displaced the same distances to the opposite end of the respective flatracks after impact.

During impact, it was observed that the top of the EPF end walls displaced approximately two to three inches in the direction of impact. No permanent deformation was observed in the flatrack or load after COFC rail impact testing.

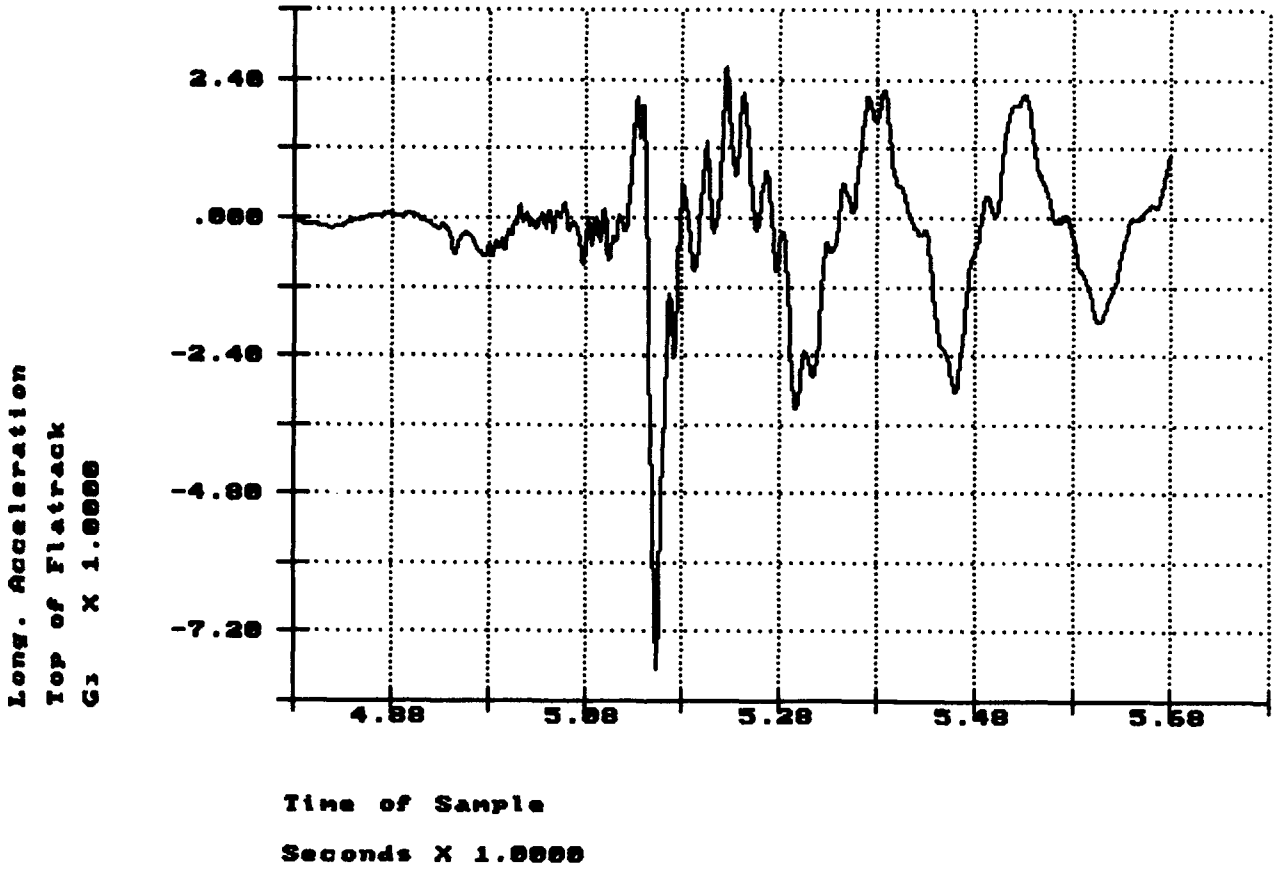
R.I. of PLS Flatracks, Impact 1: 4.34MPH Nov 15 15:53:30 1993



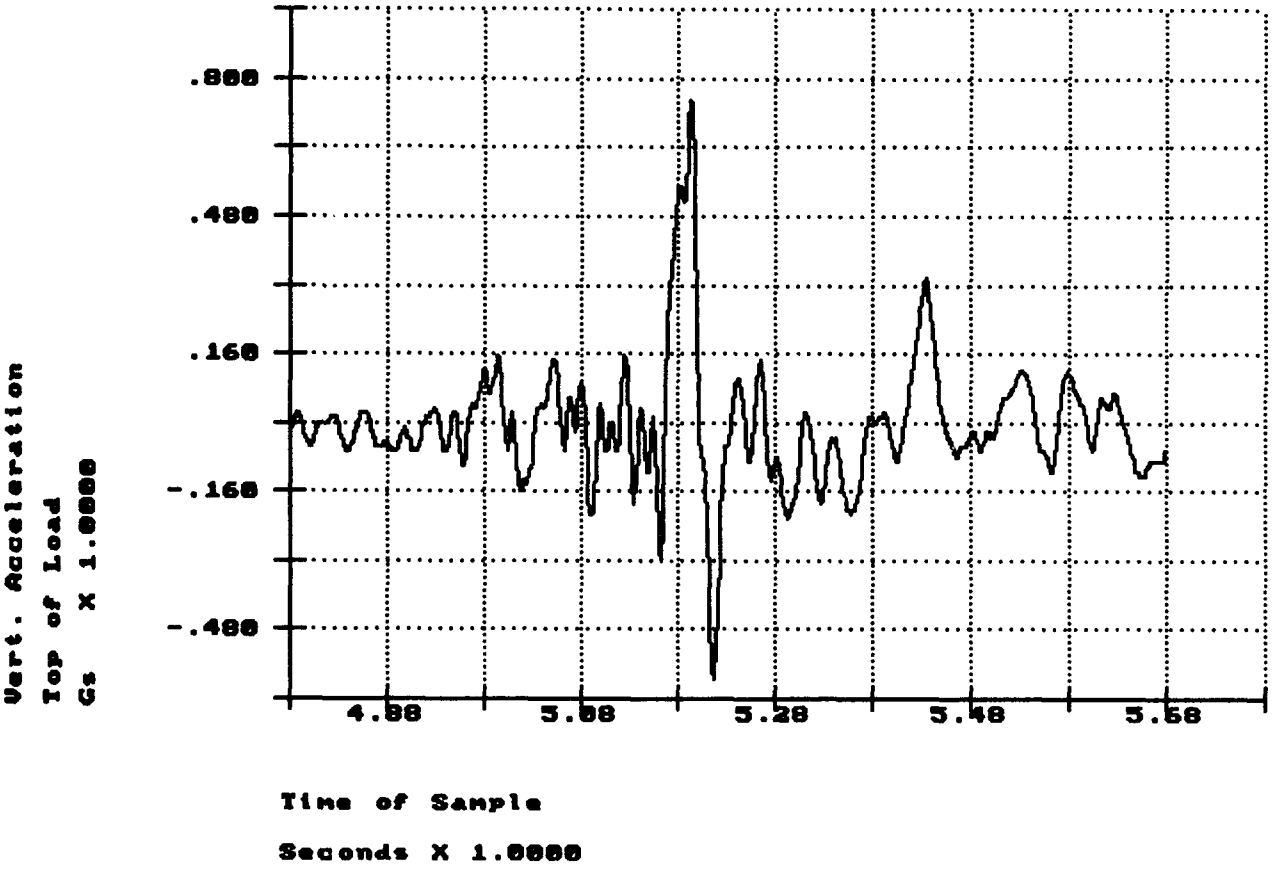
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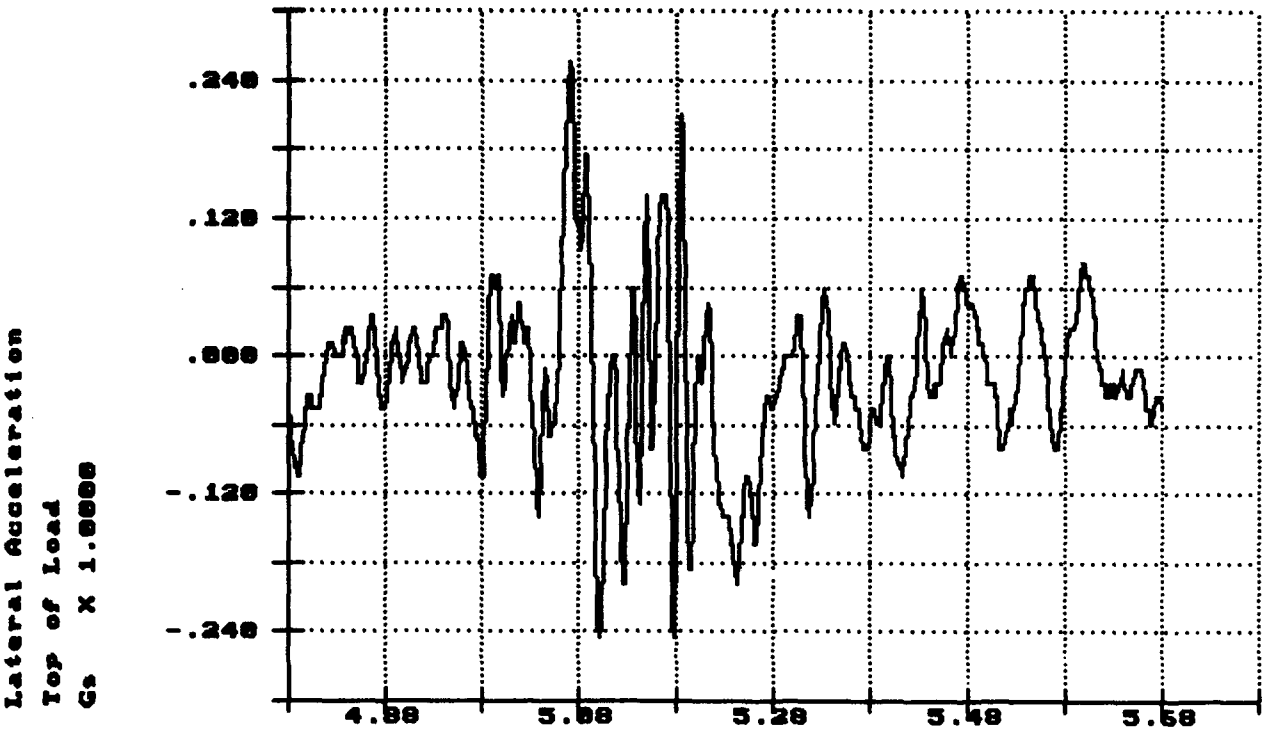
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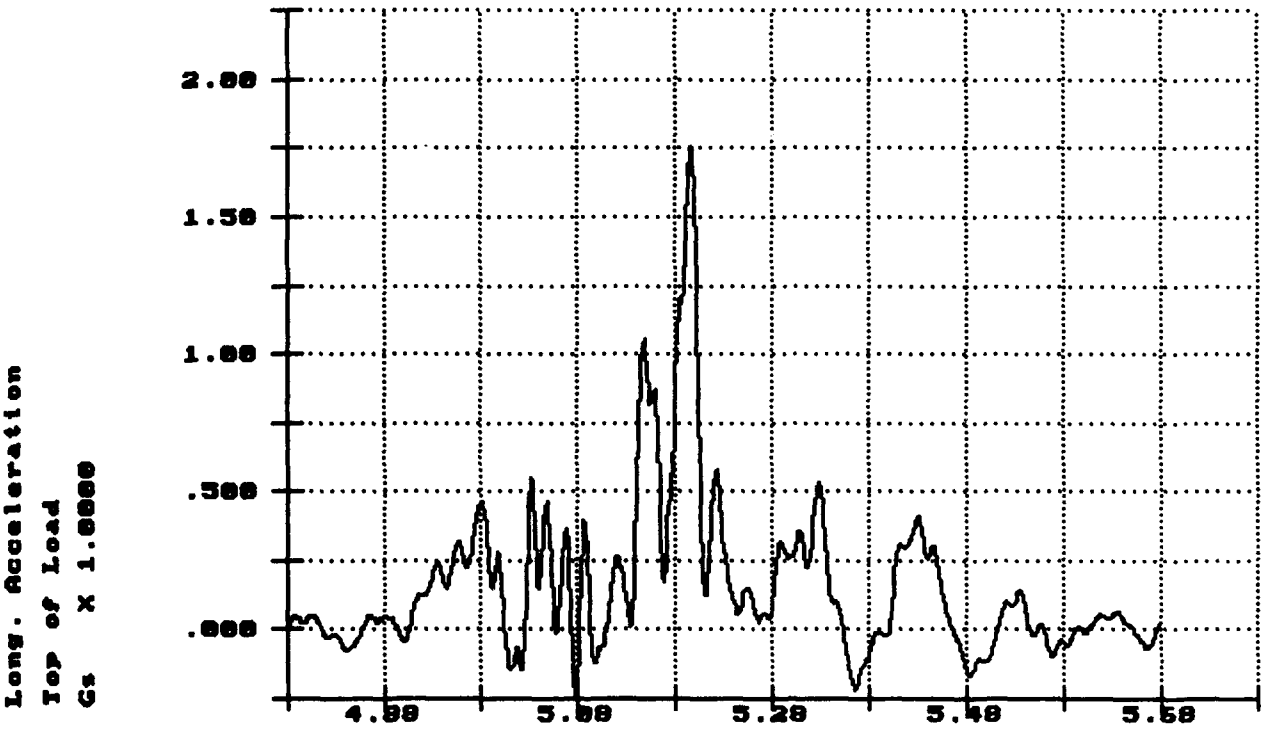
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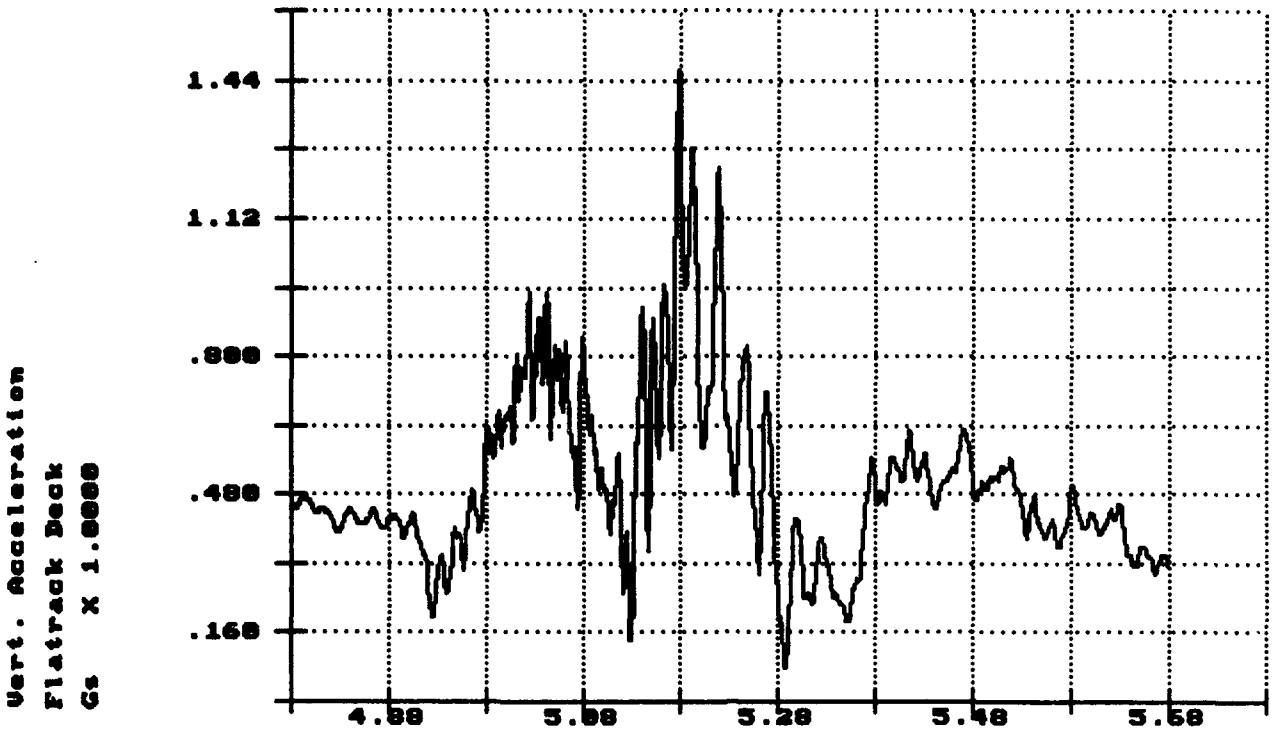
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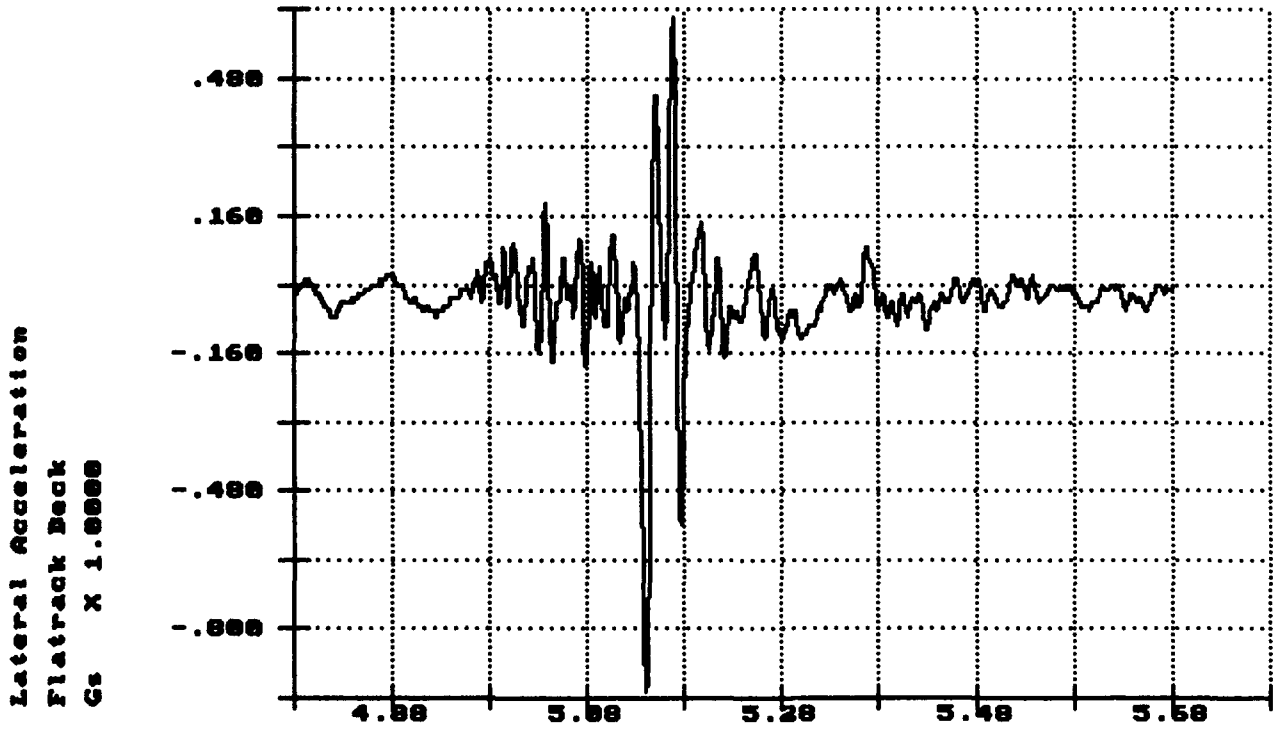
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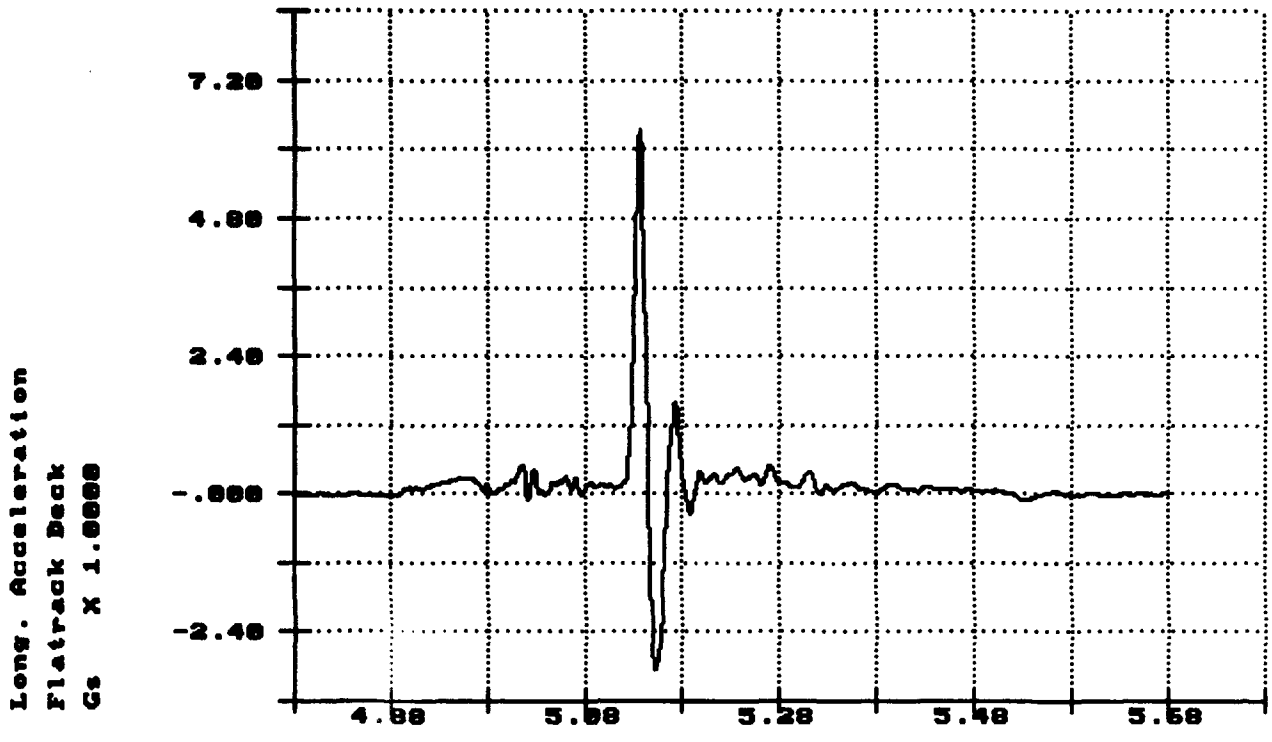
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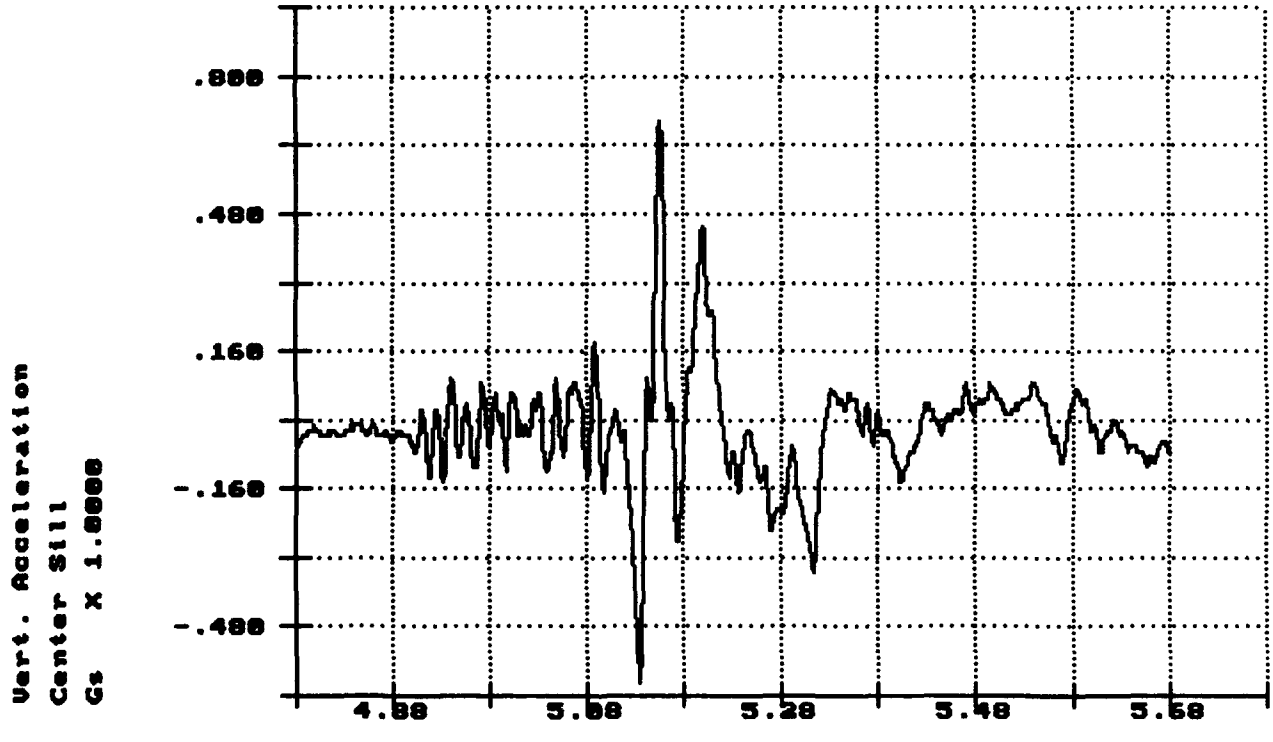
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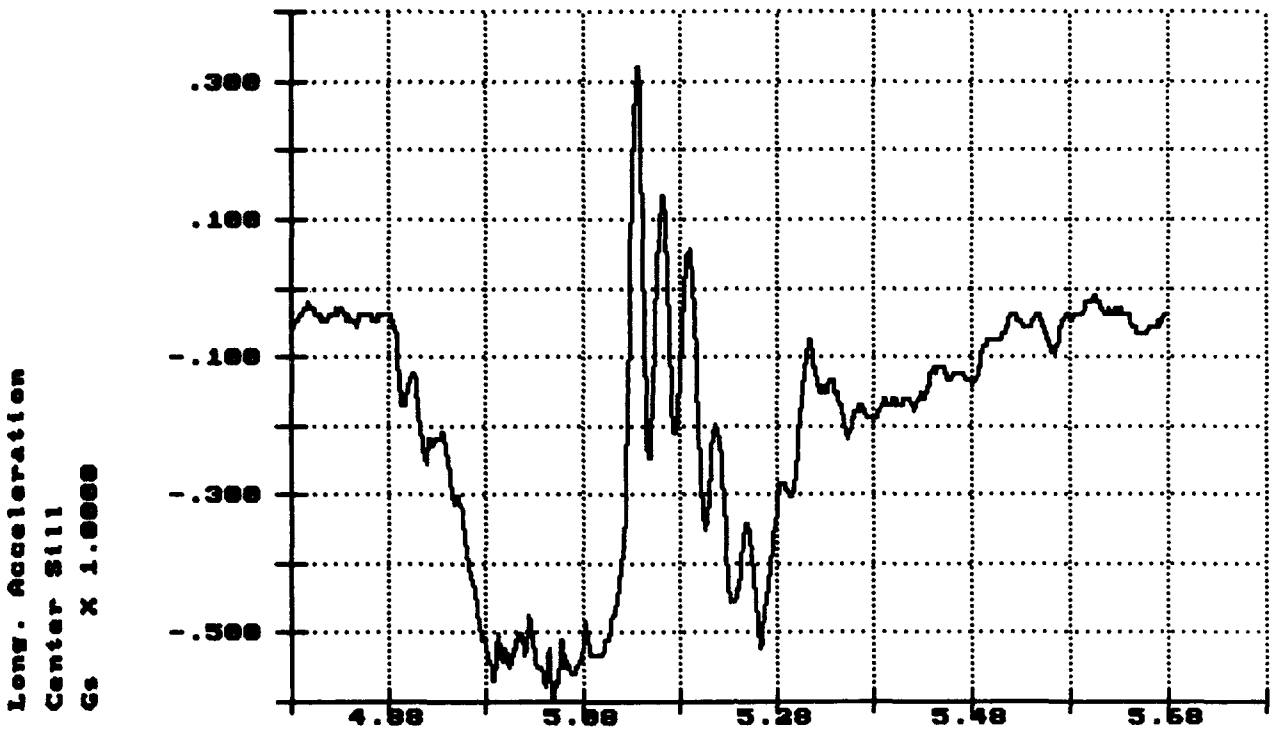
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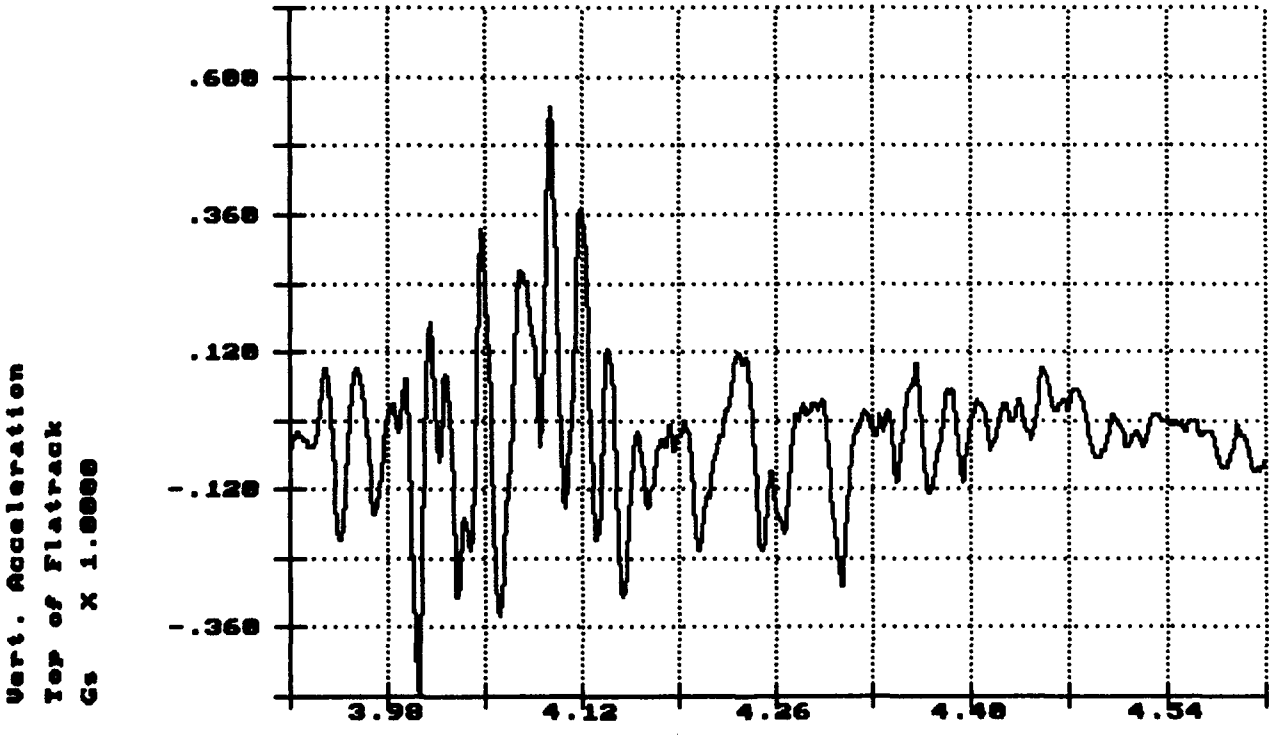
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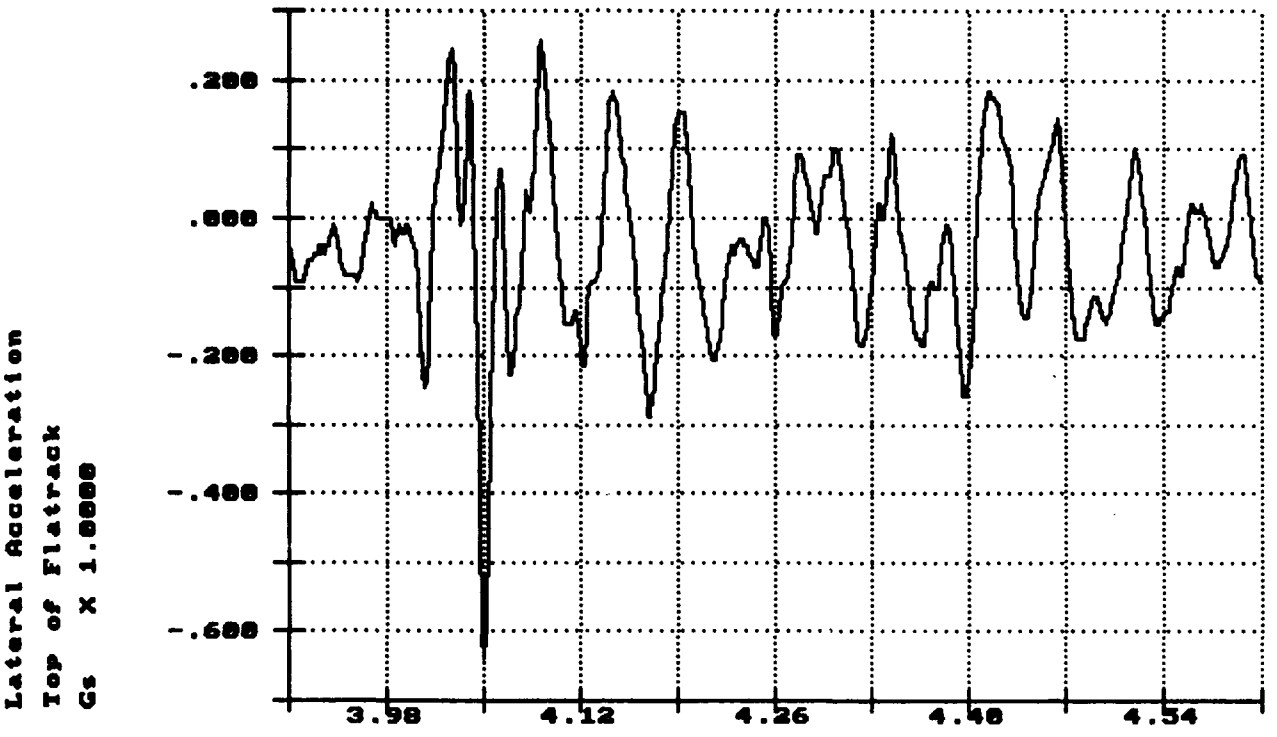
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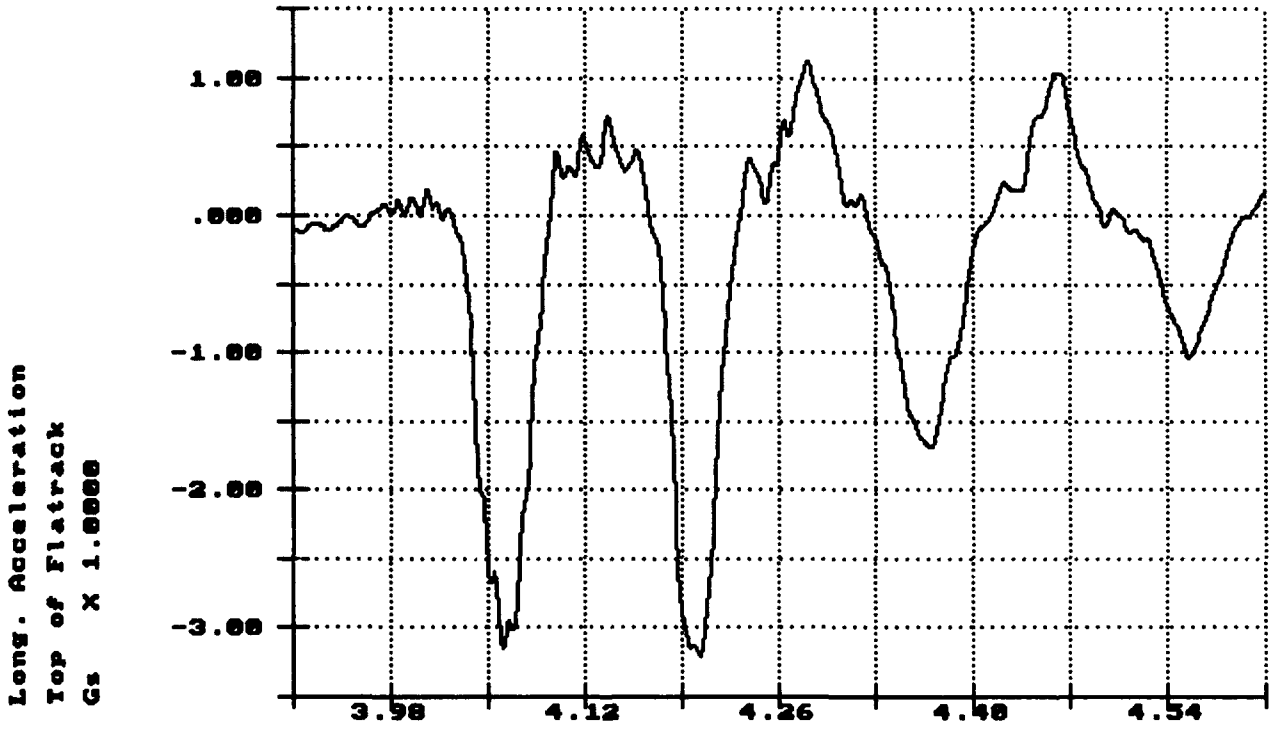
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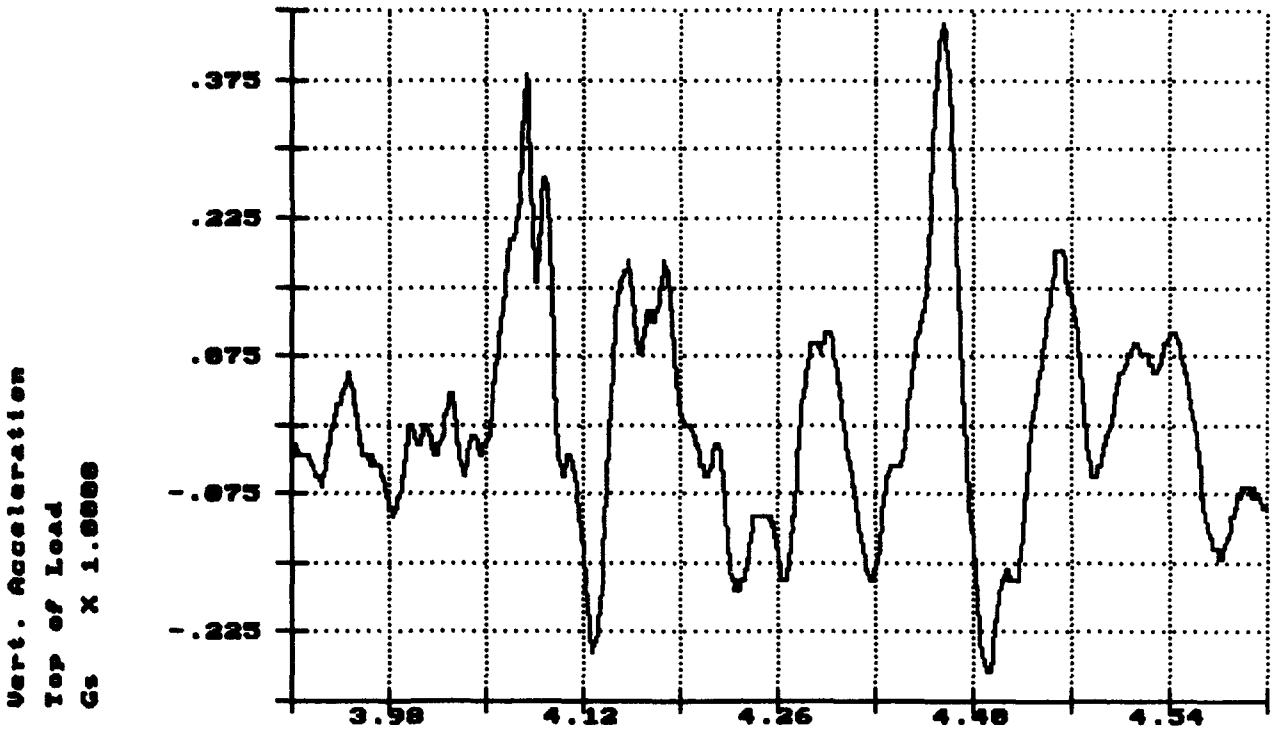
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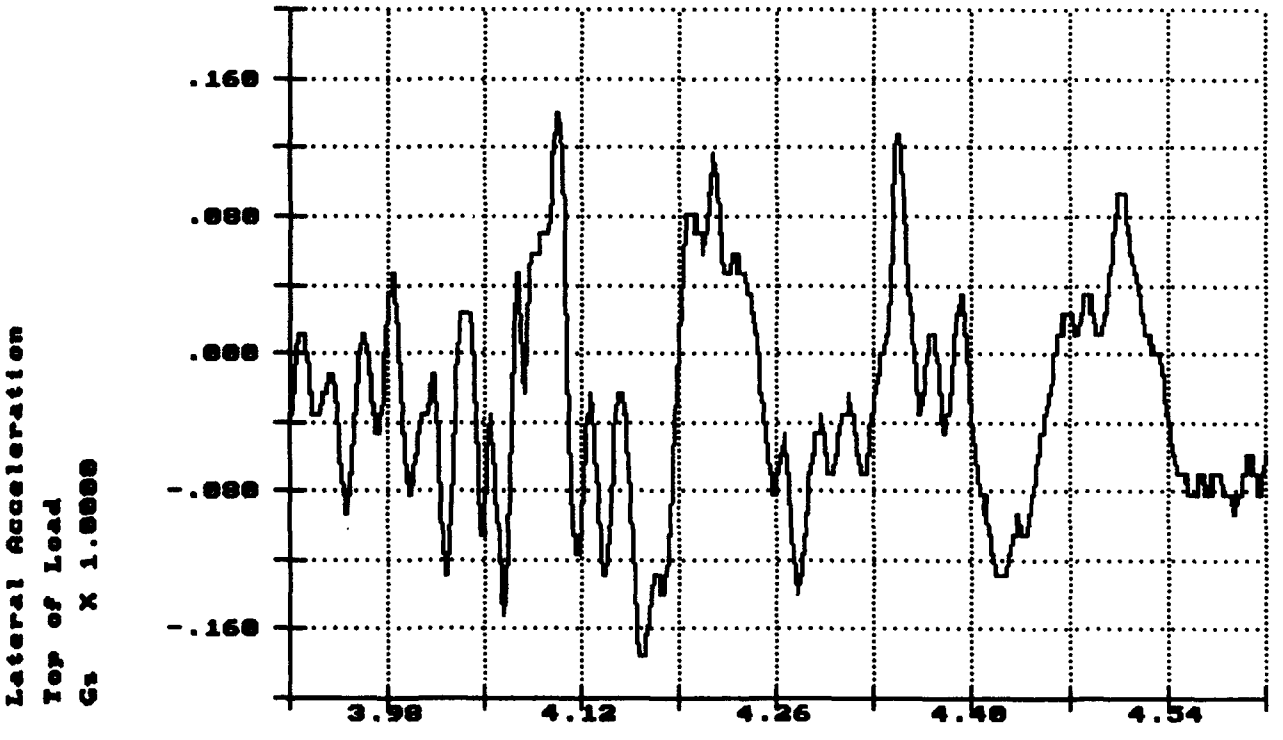
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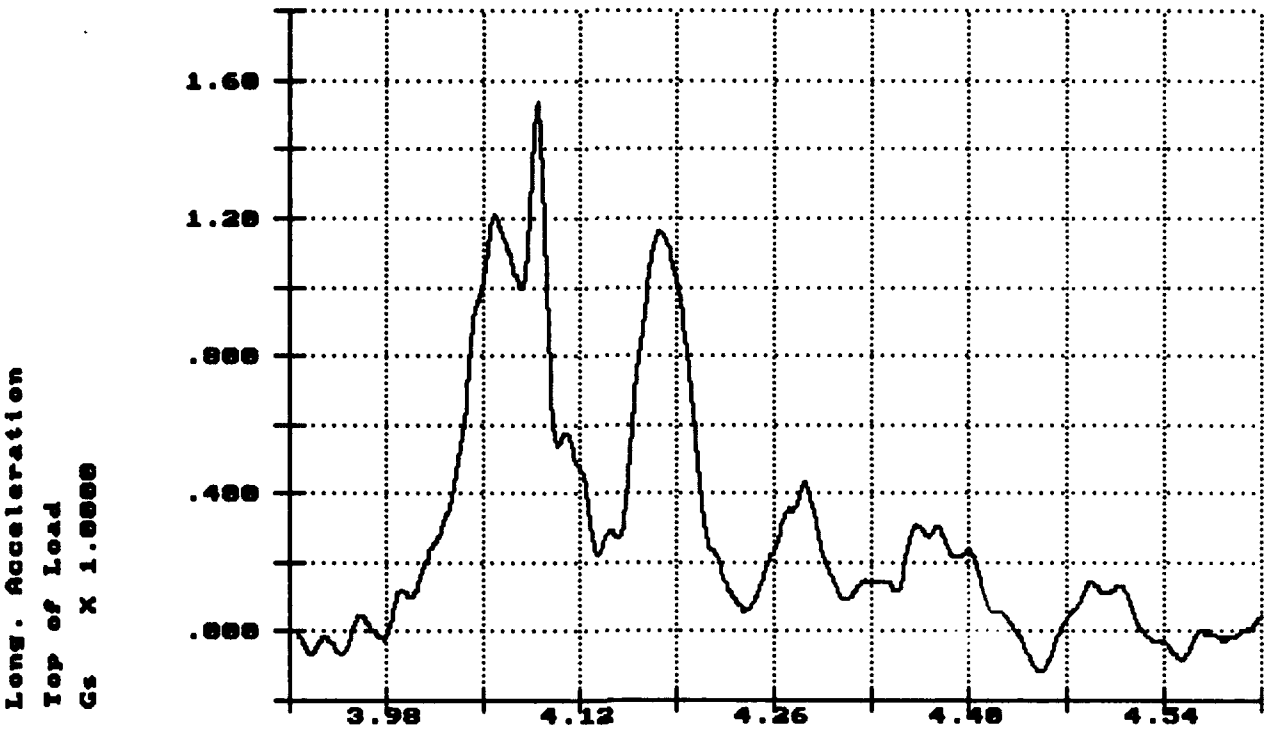
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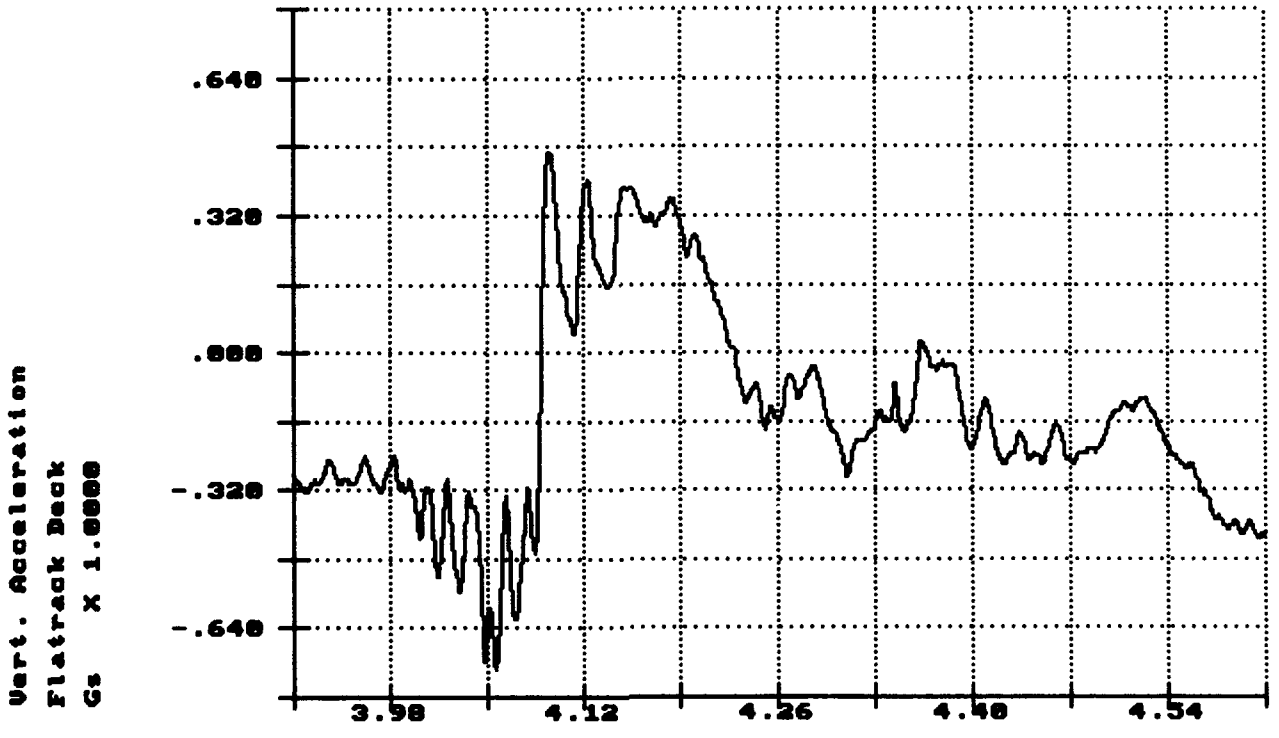
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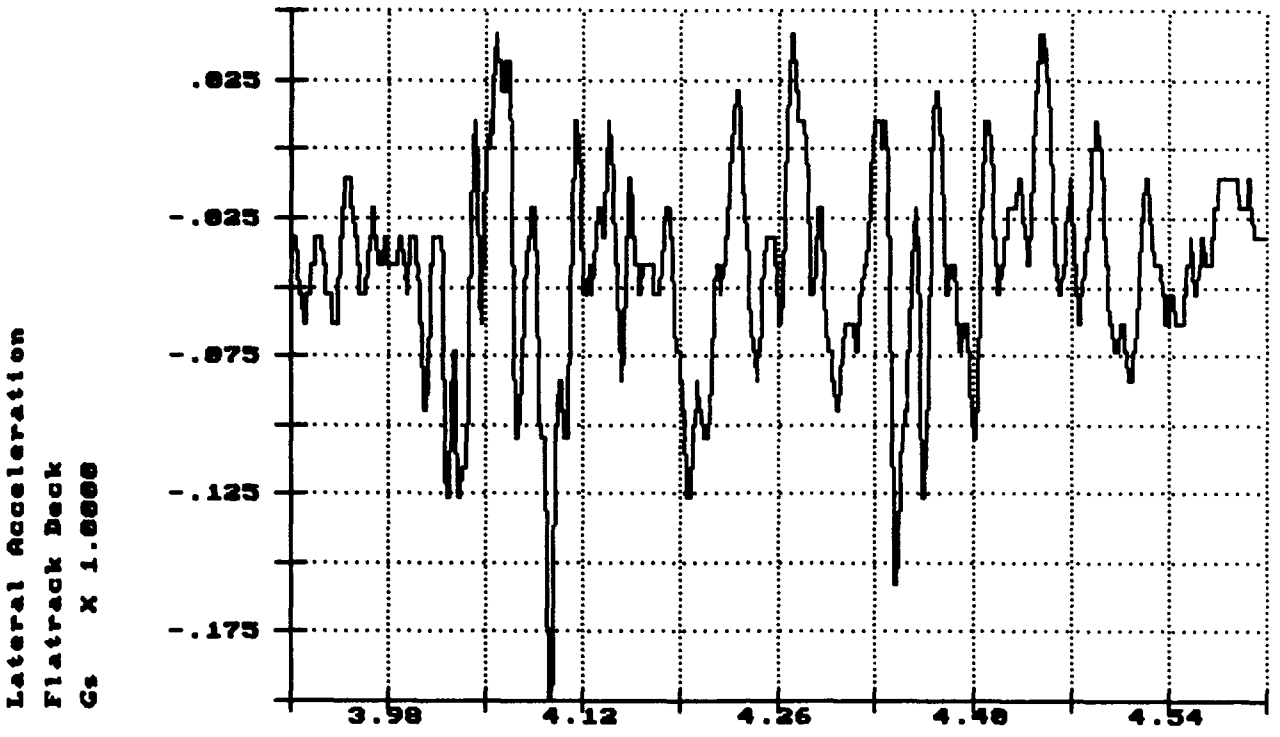
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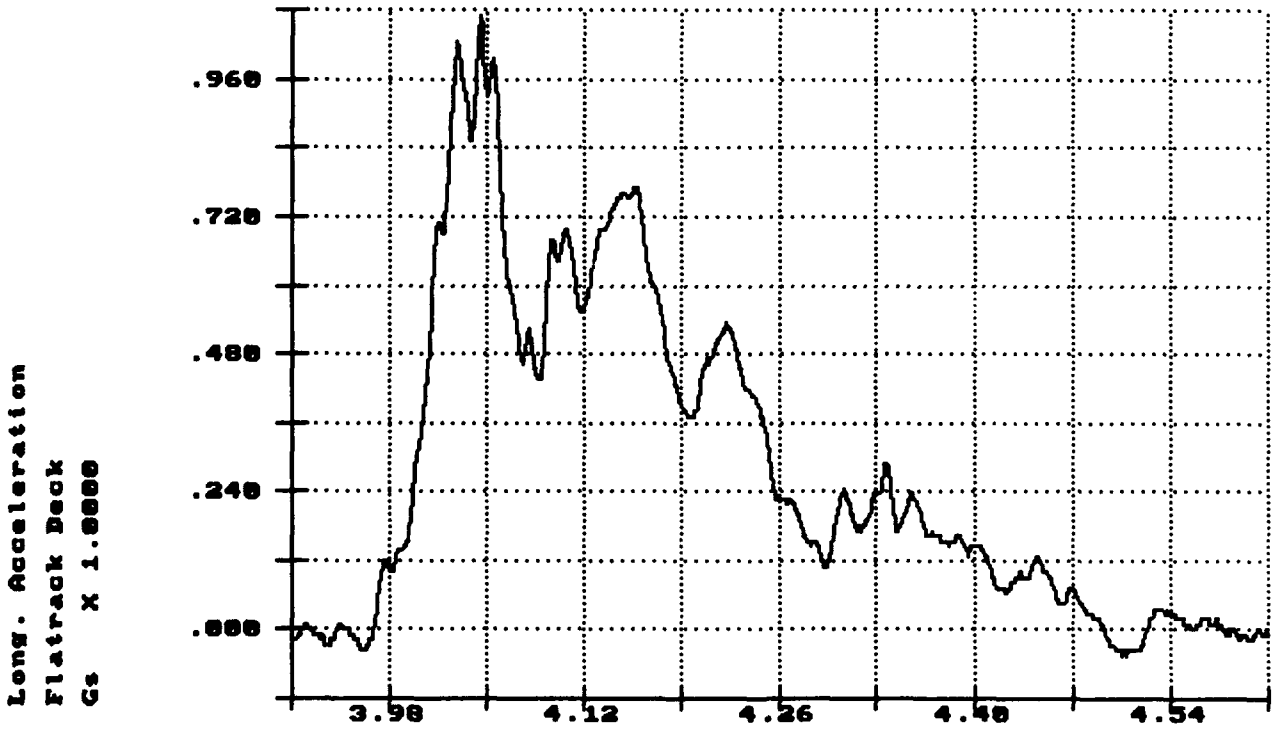
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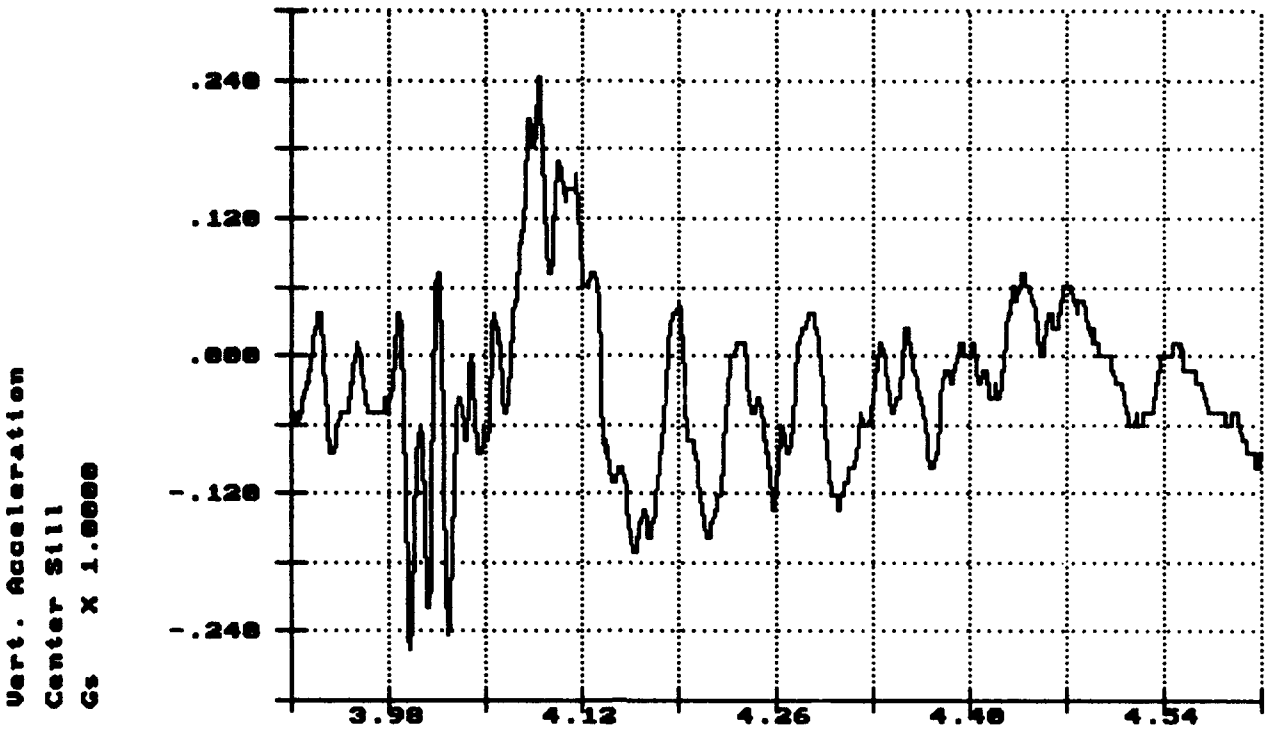
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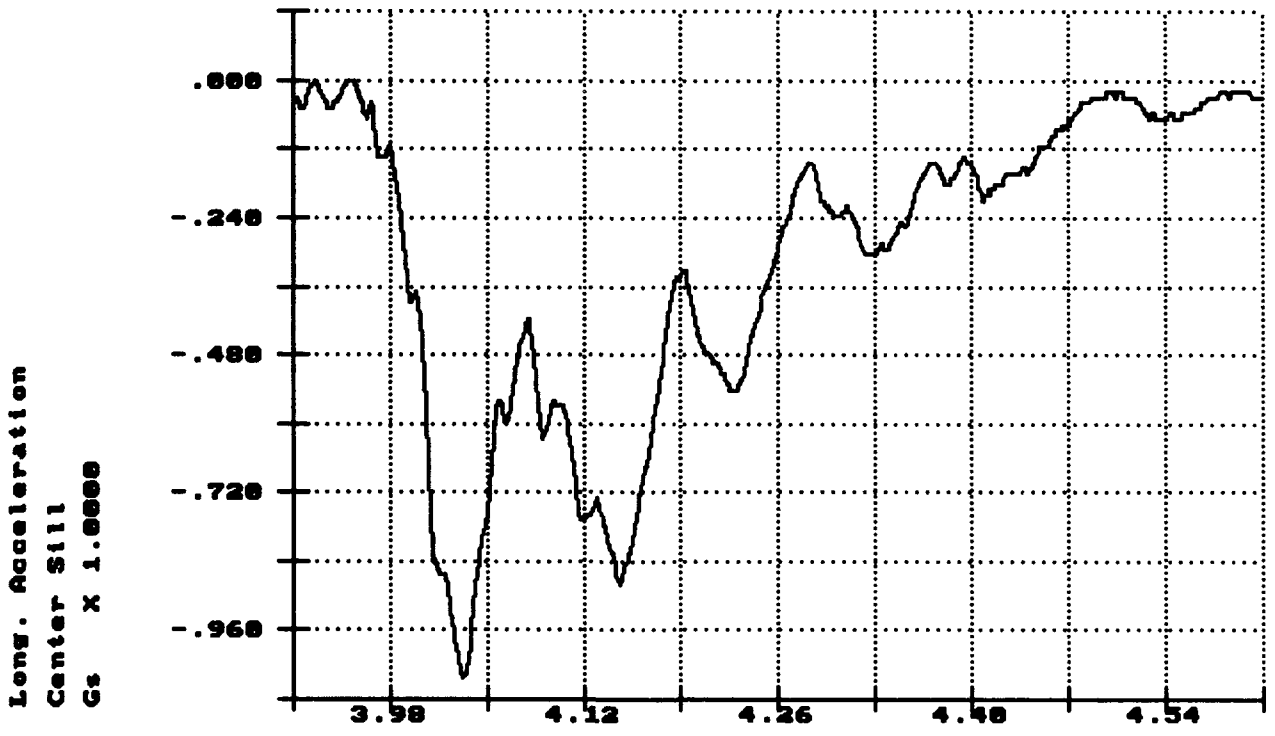
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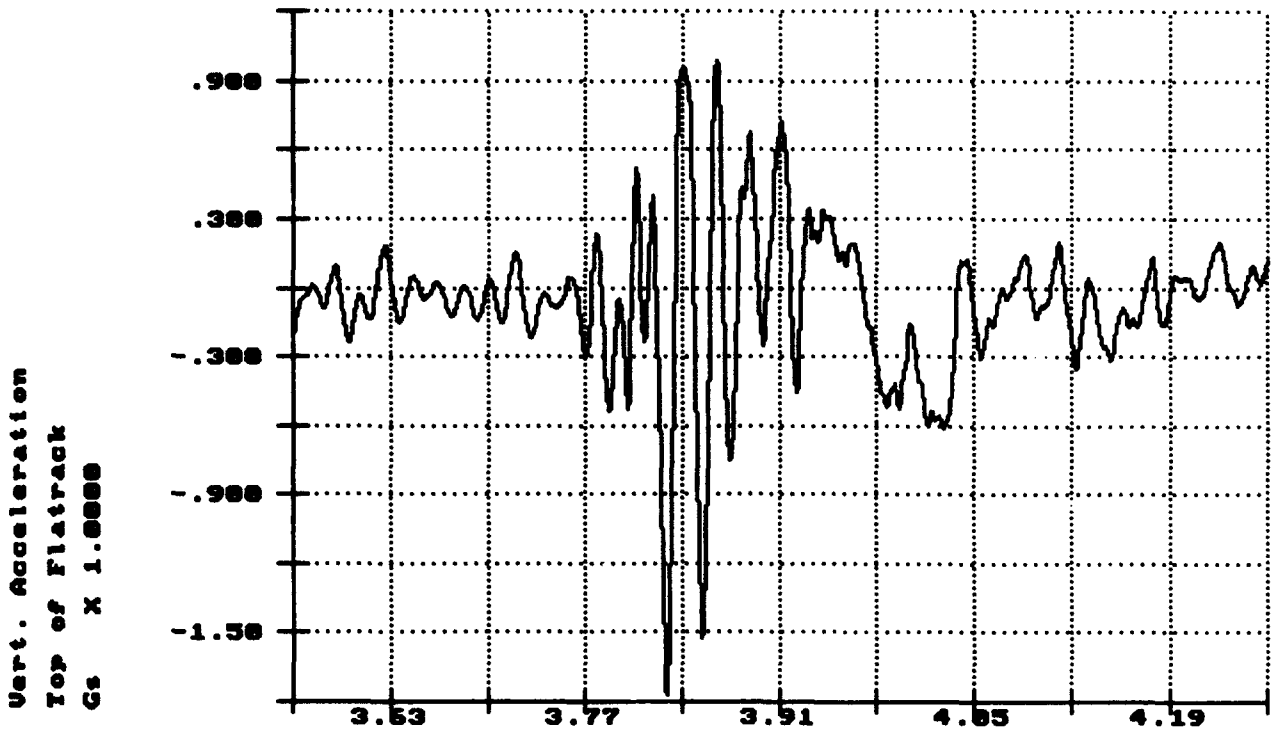
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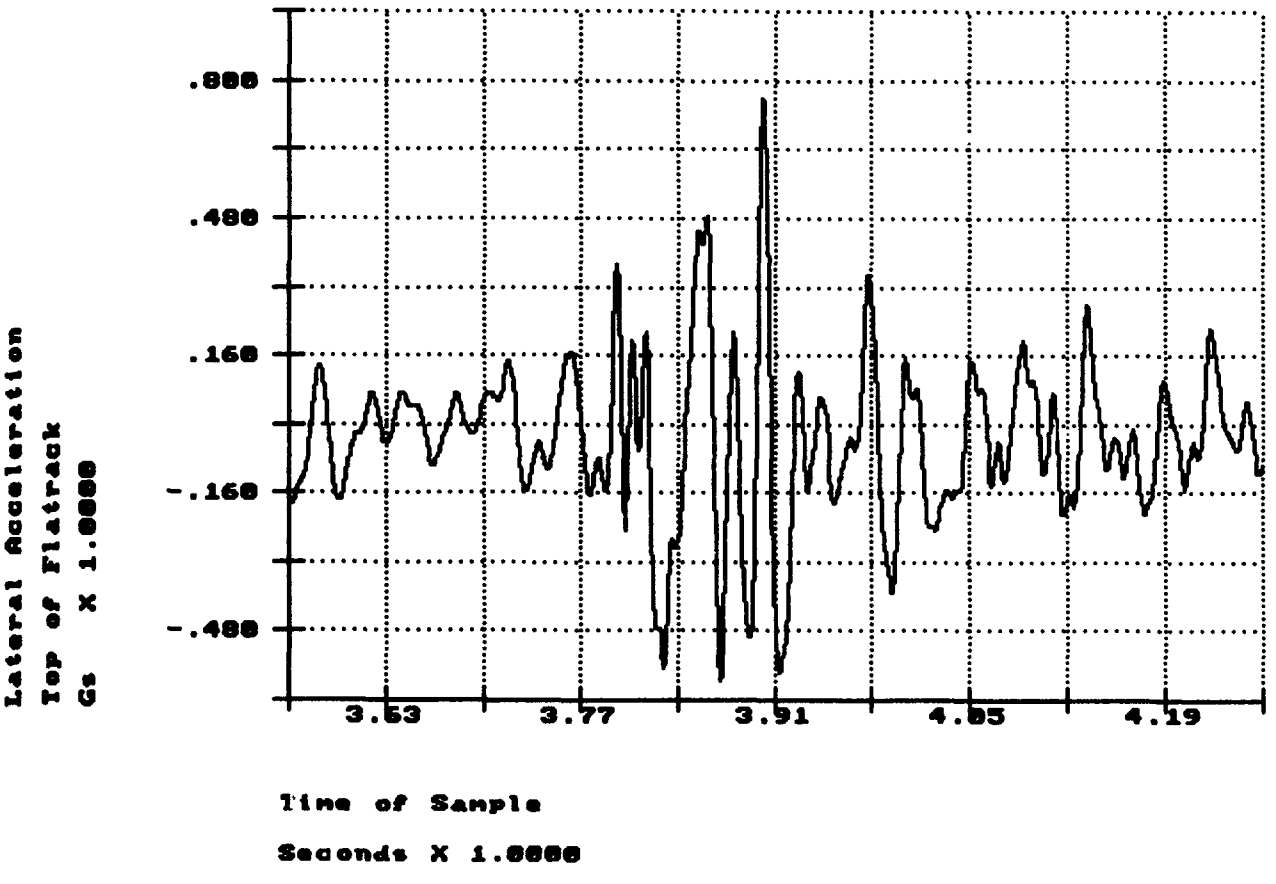
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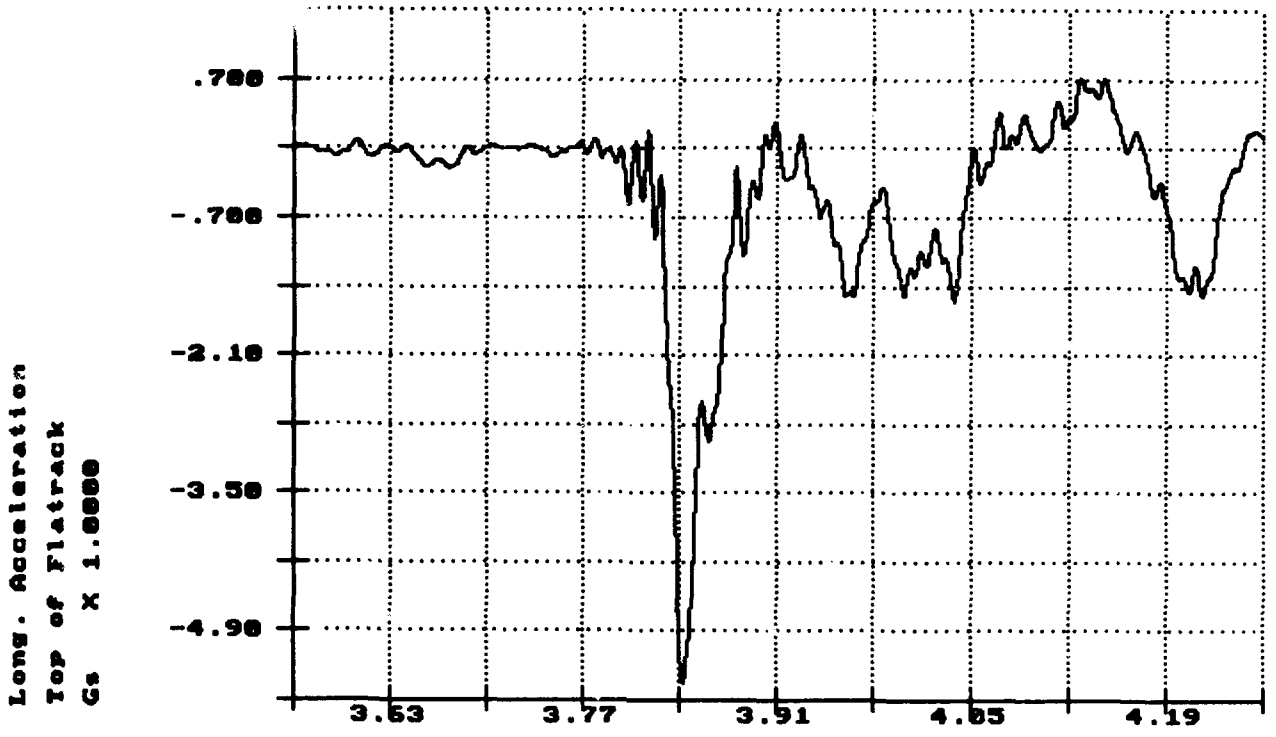
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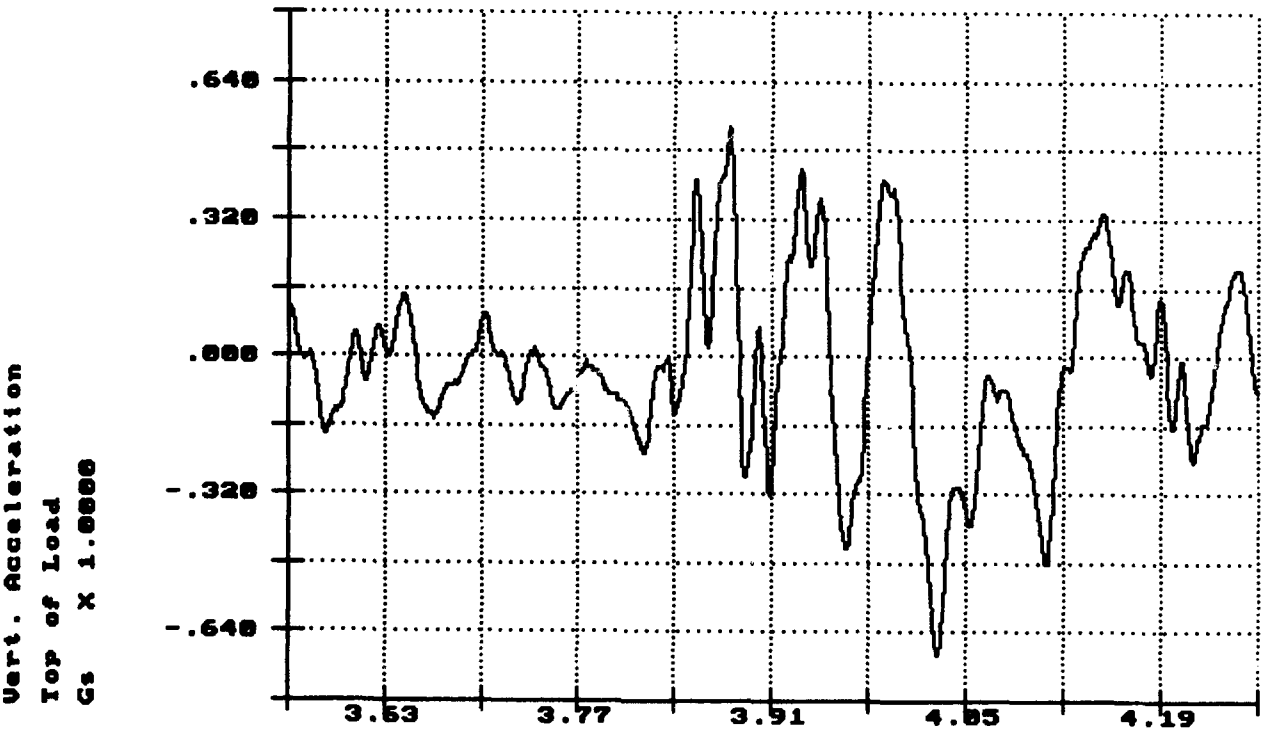
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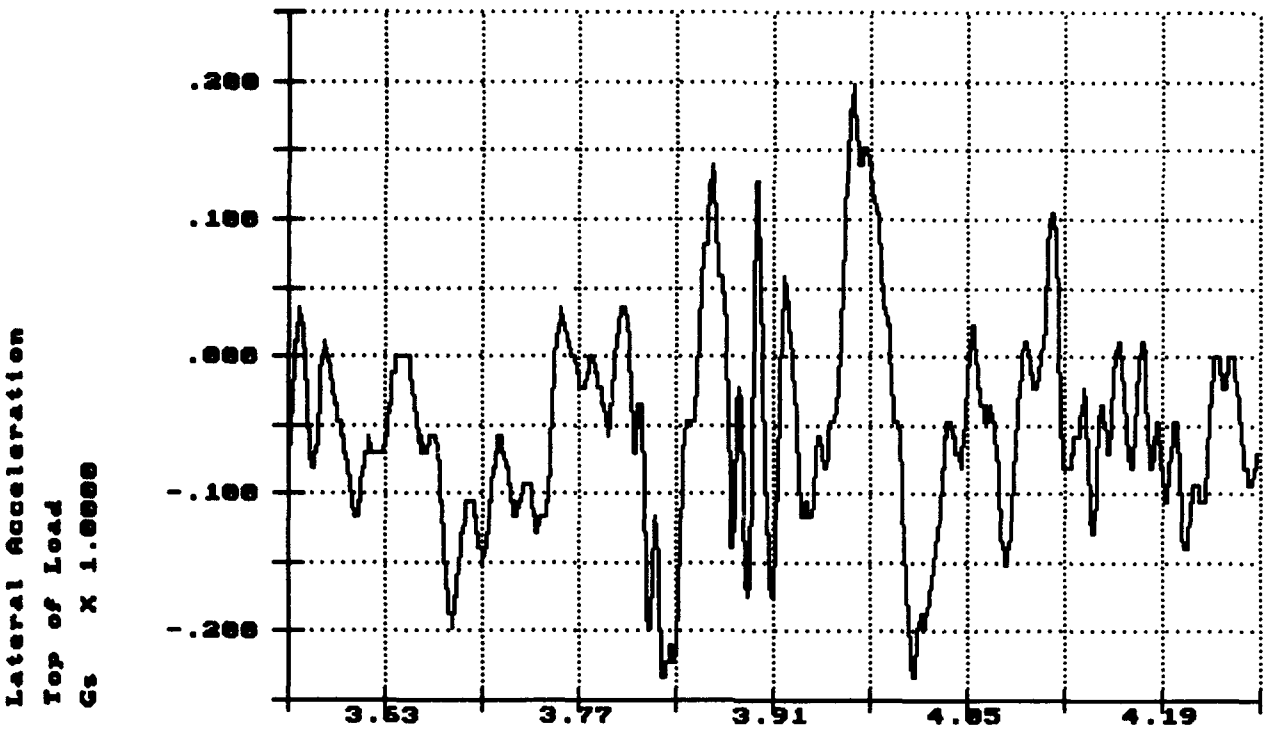
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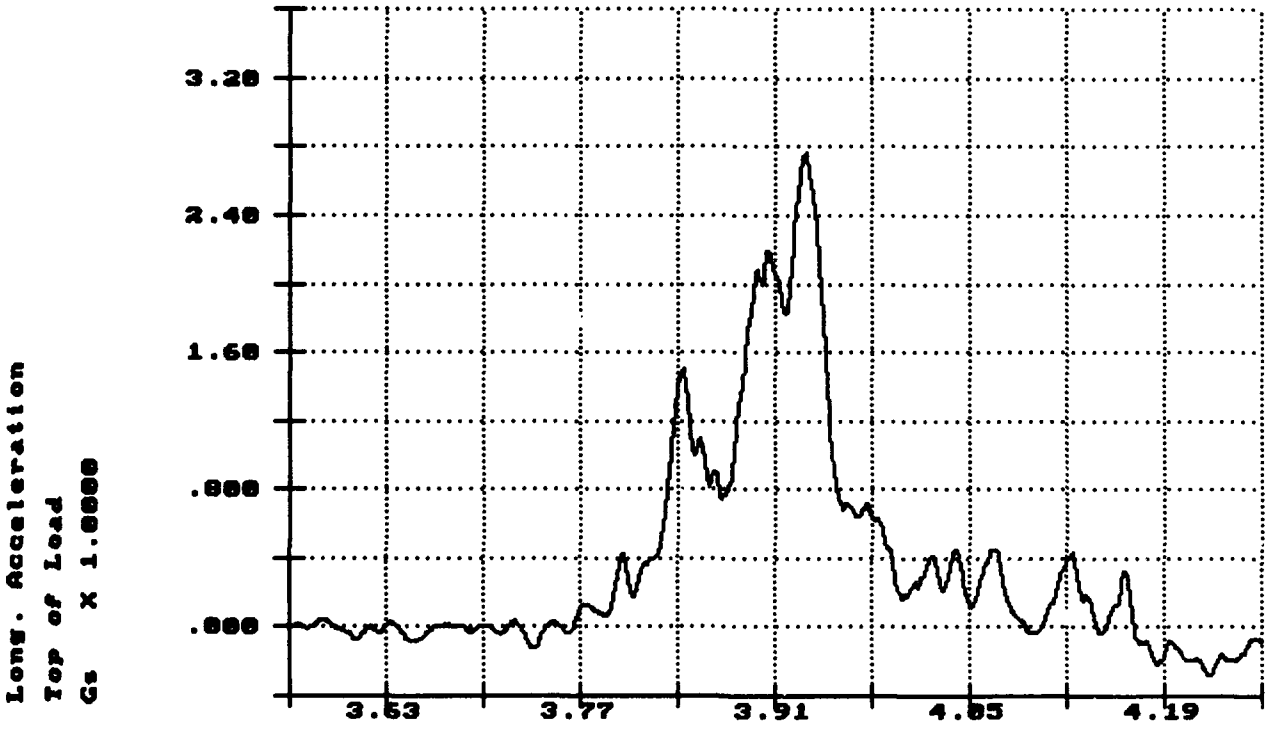
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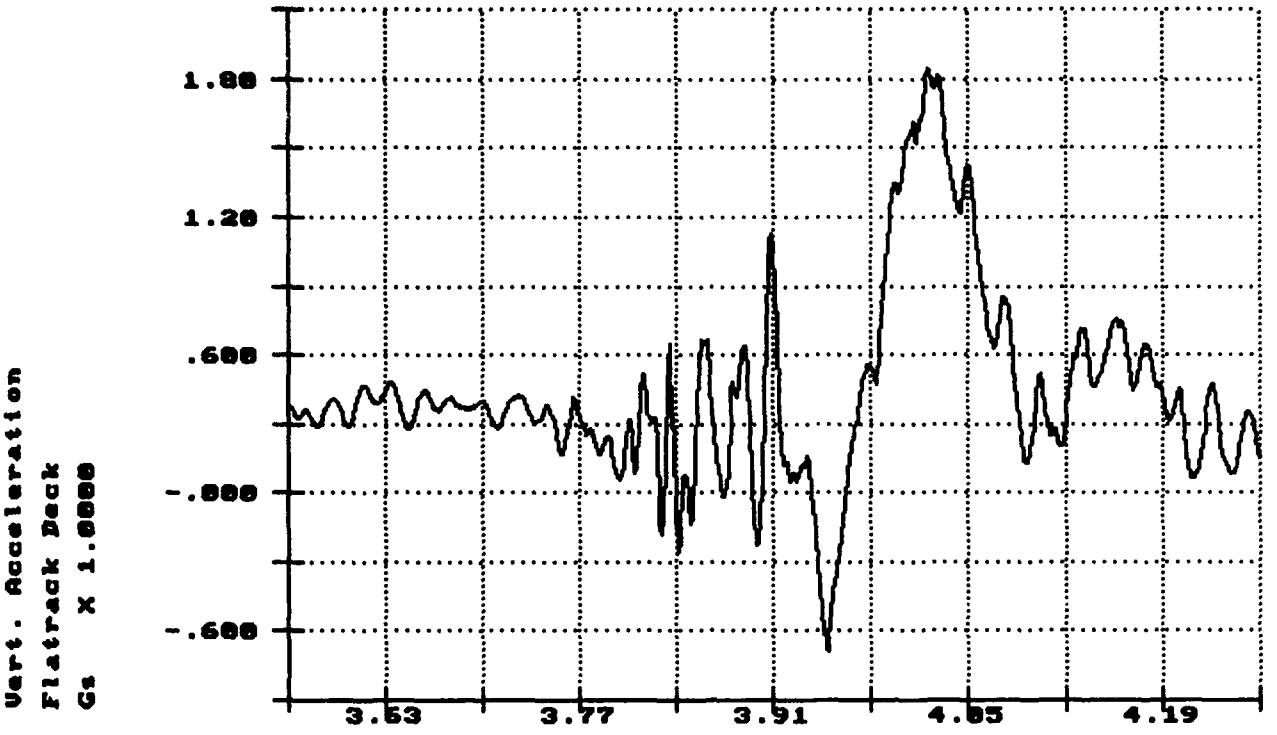
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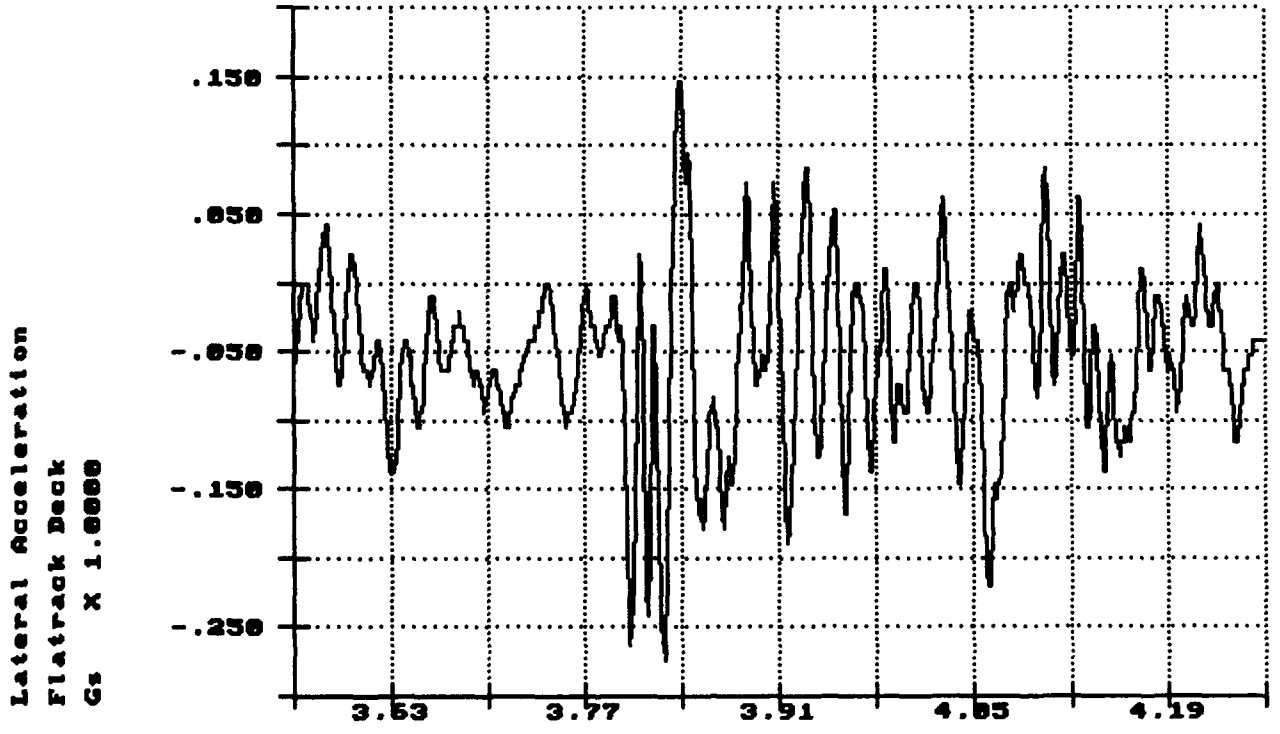
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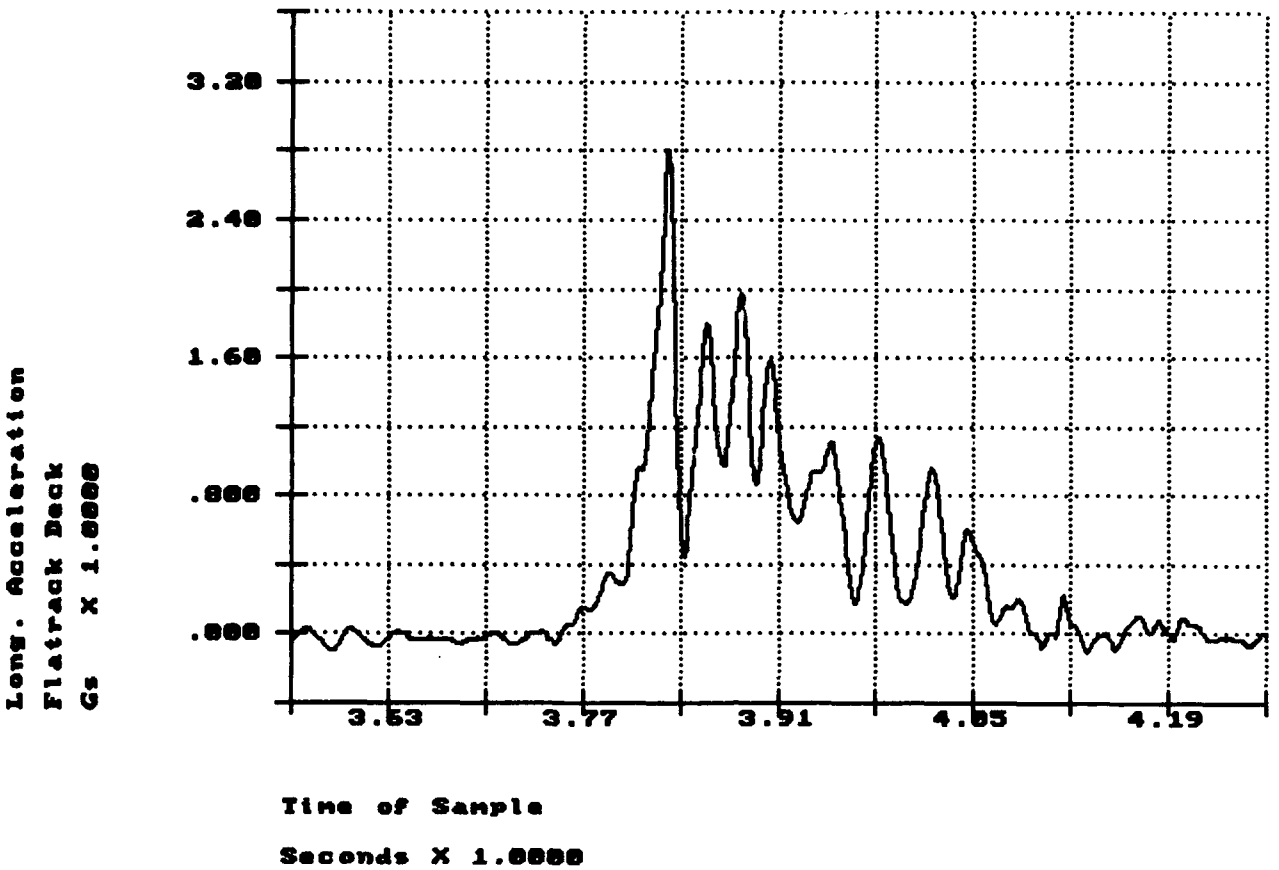
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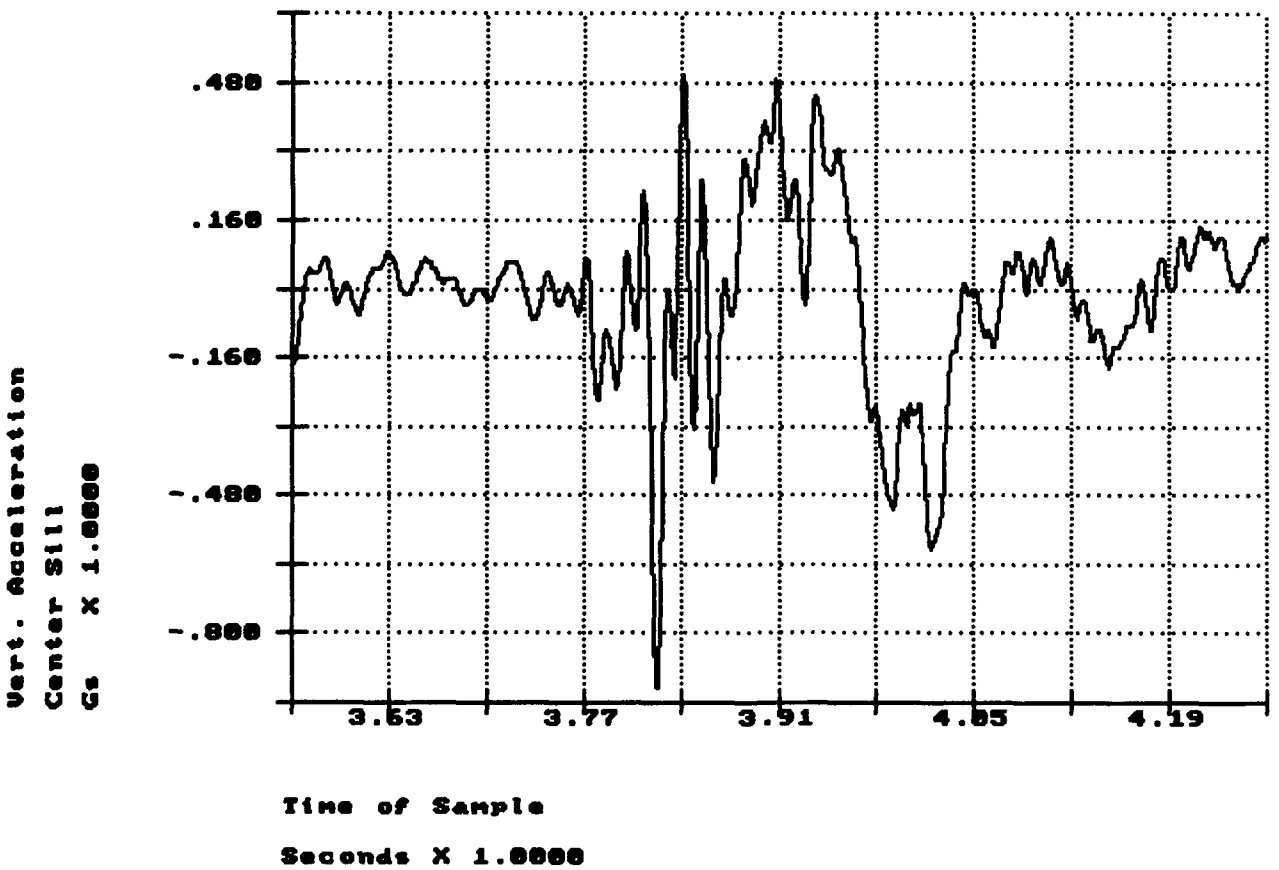
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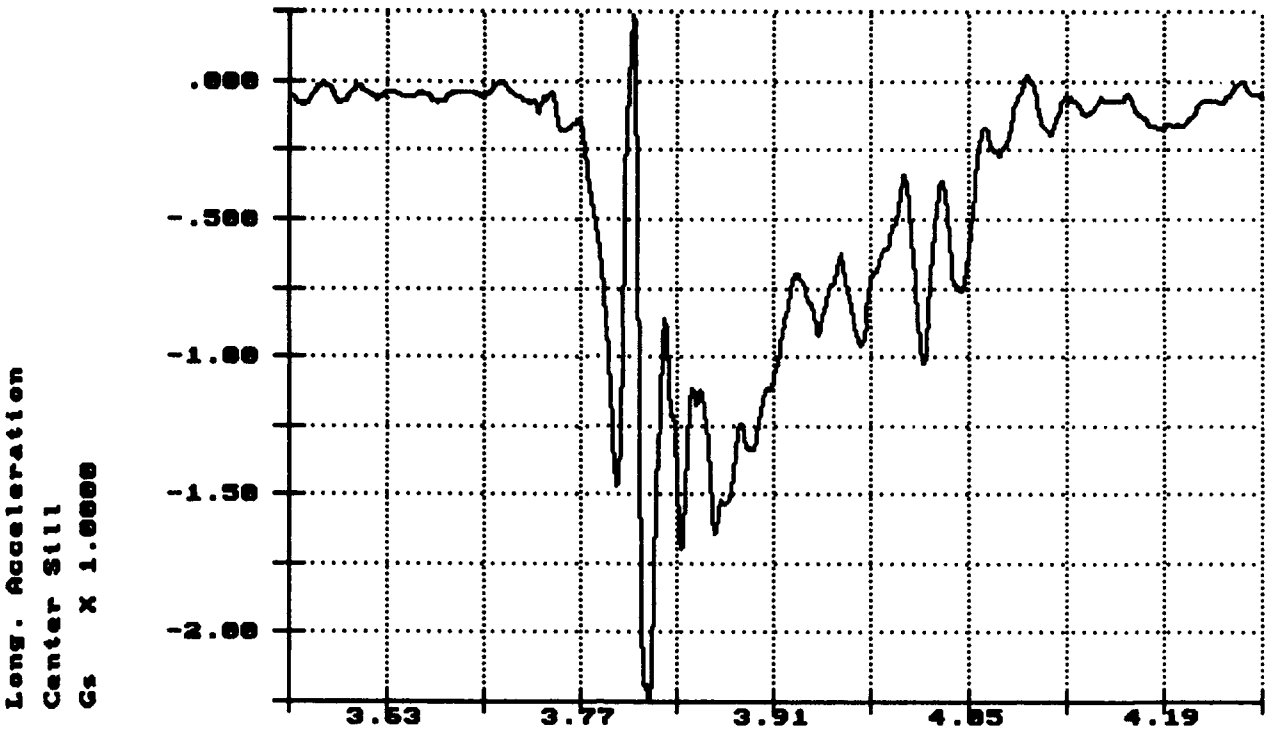
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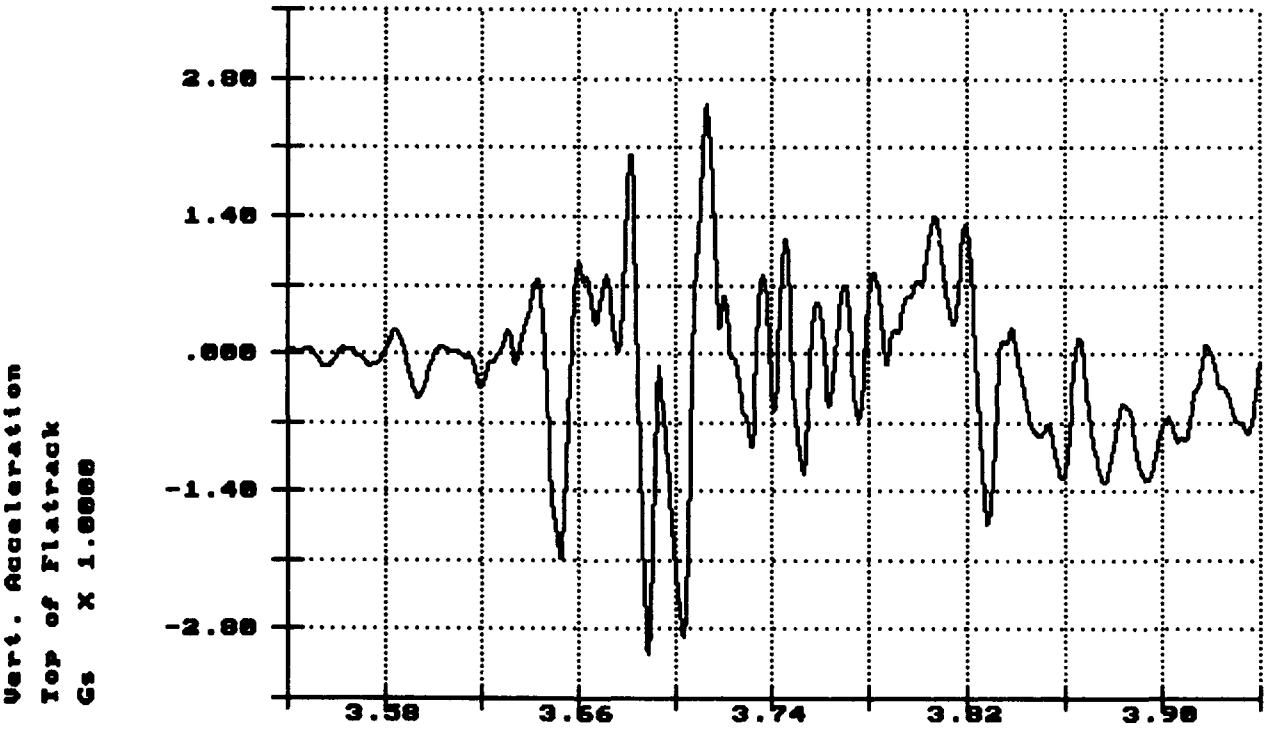
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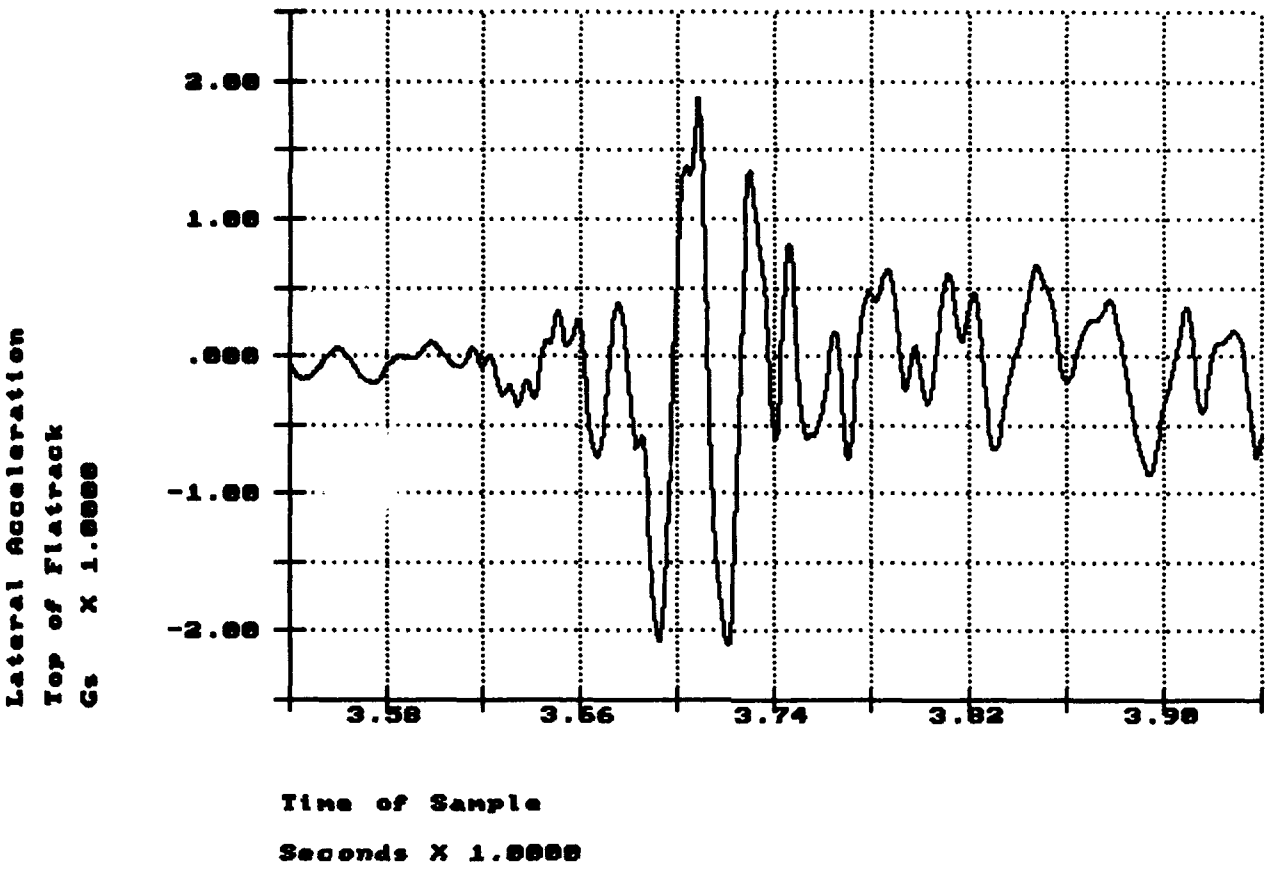
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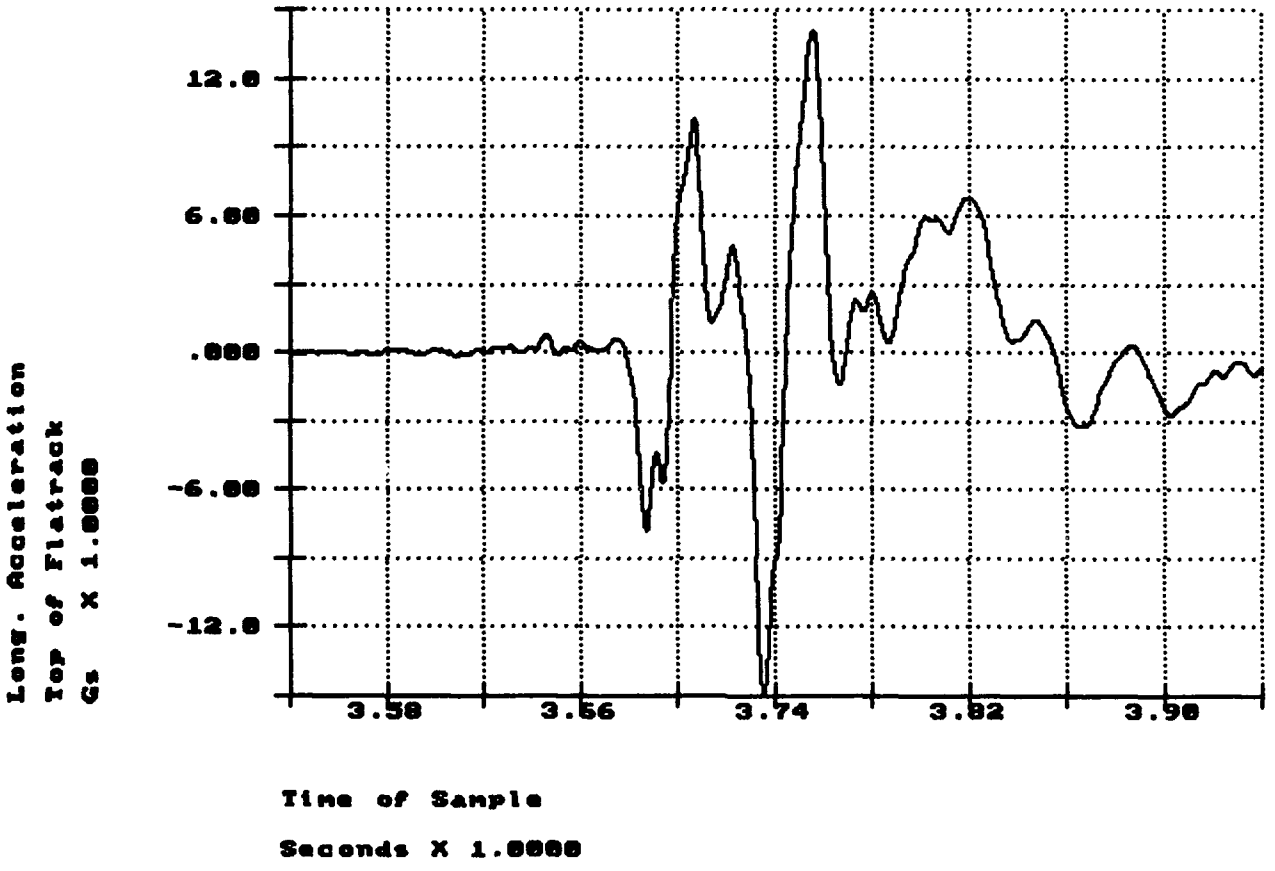
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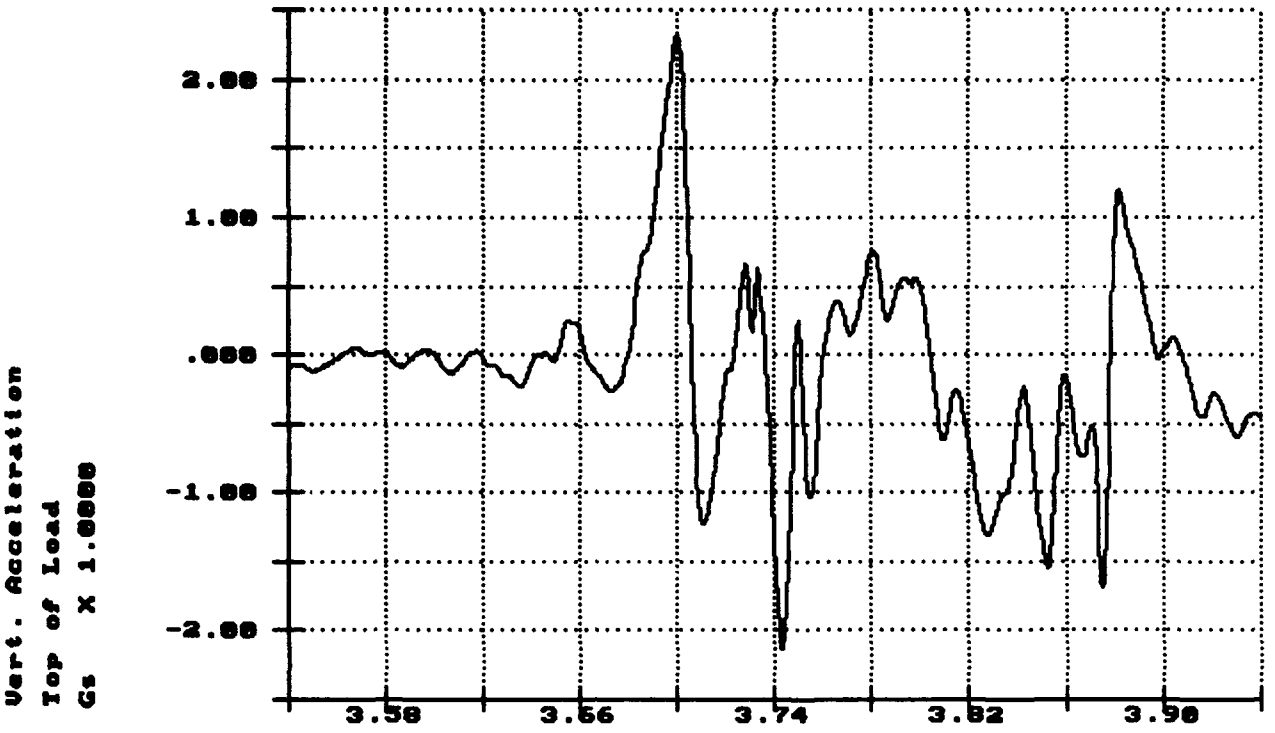
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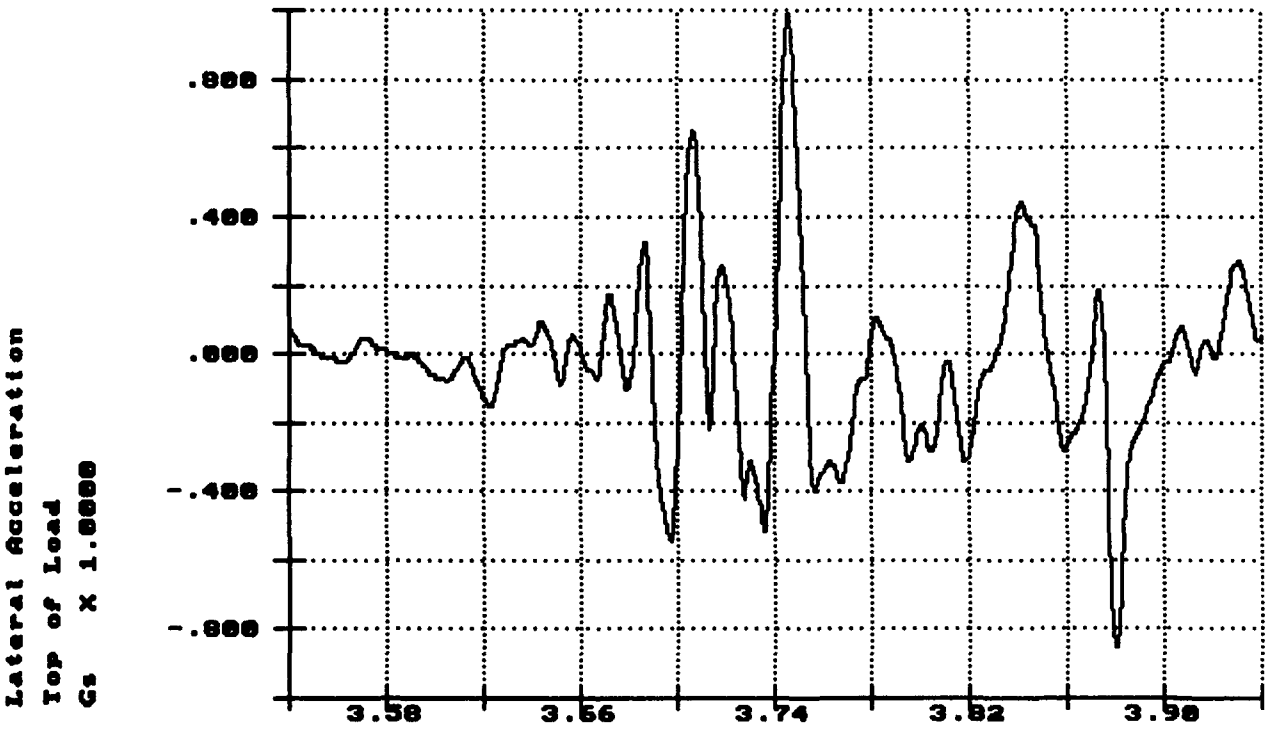
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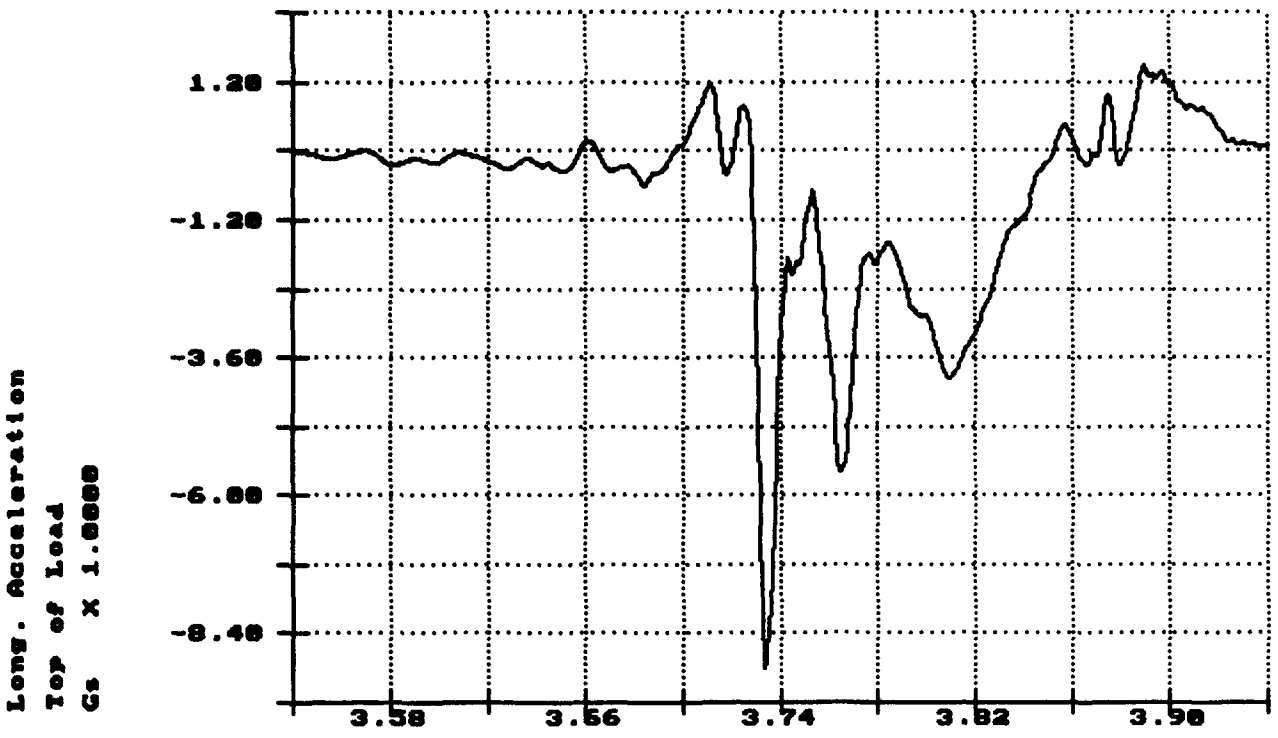
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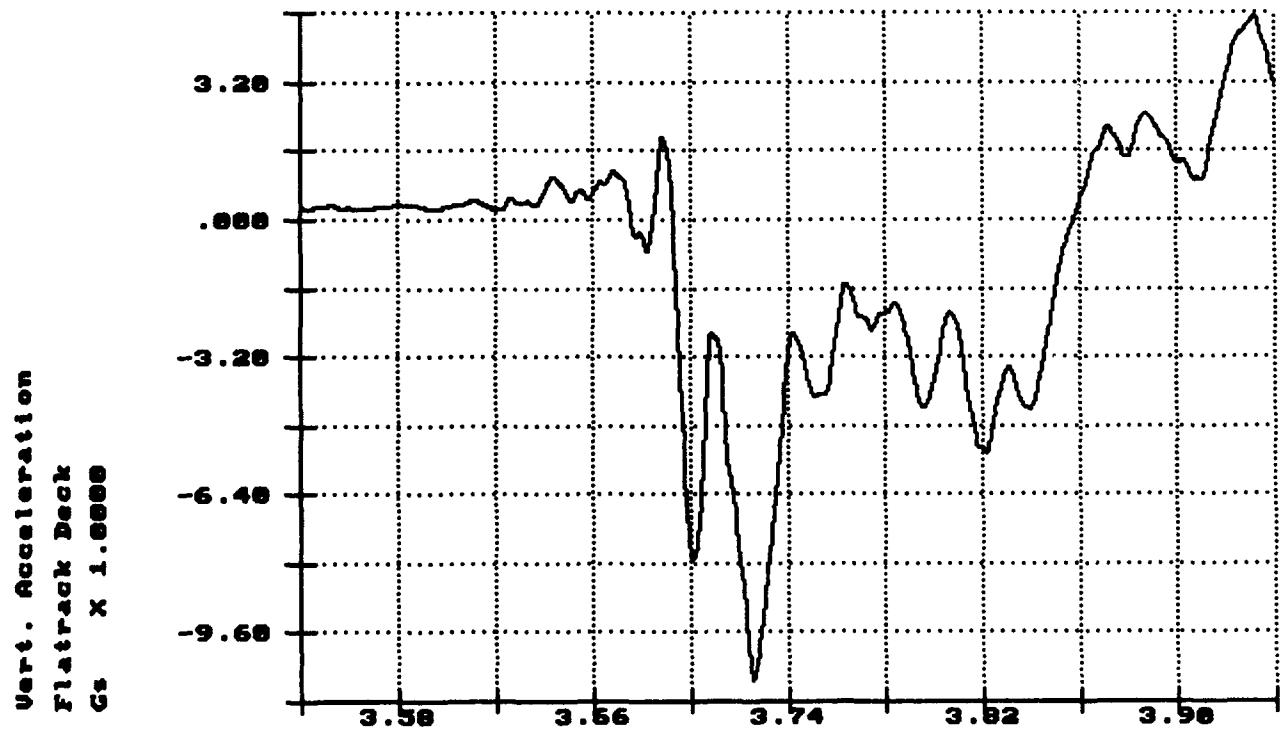
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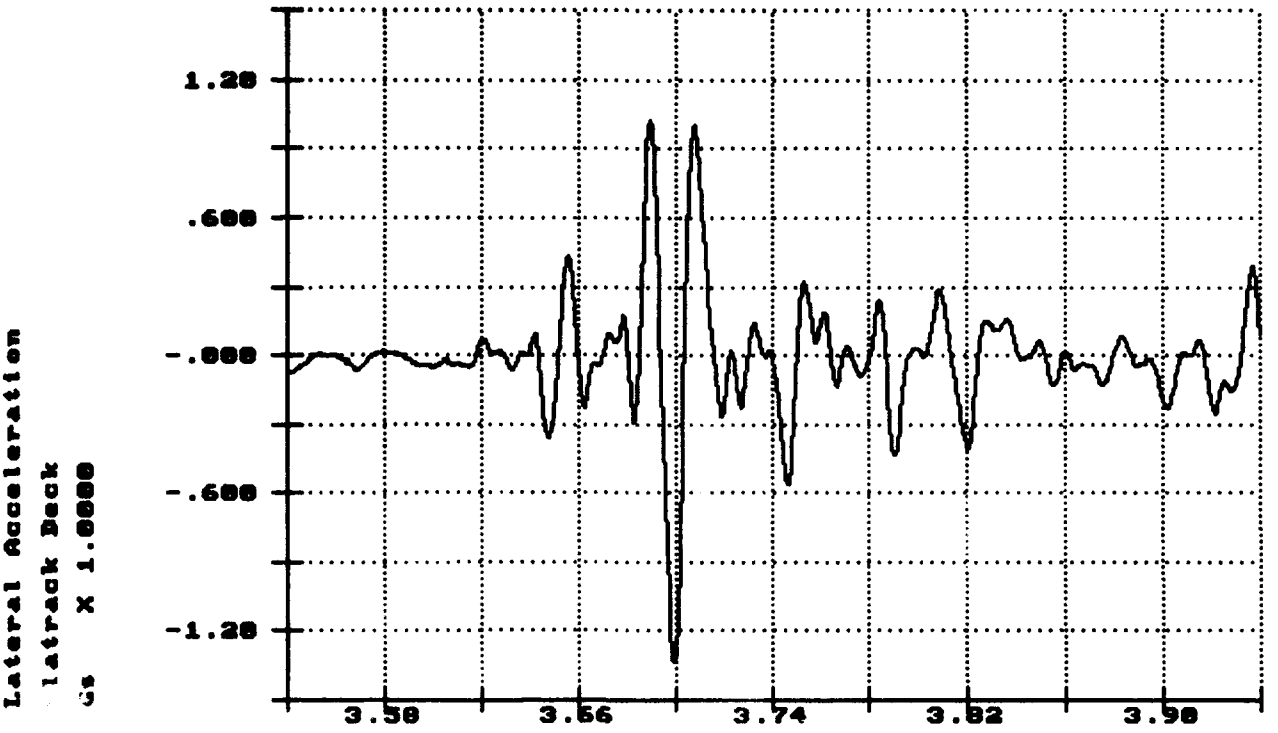
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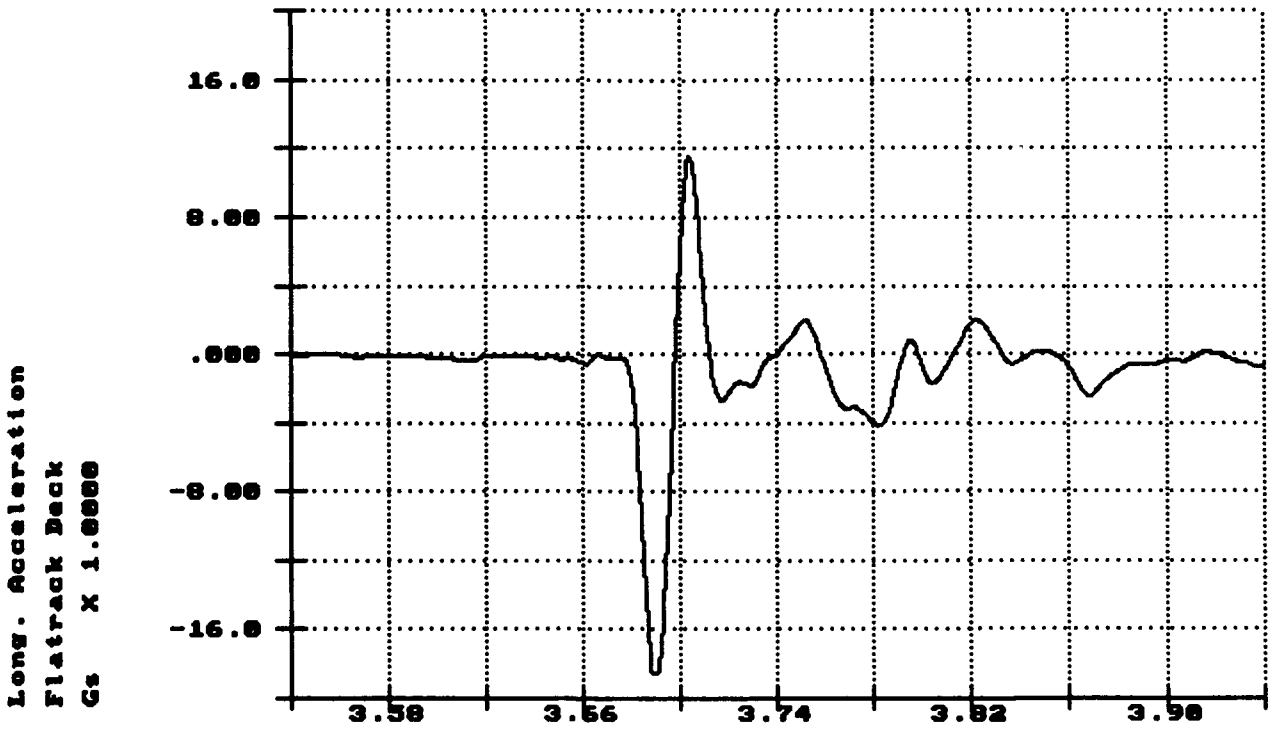
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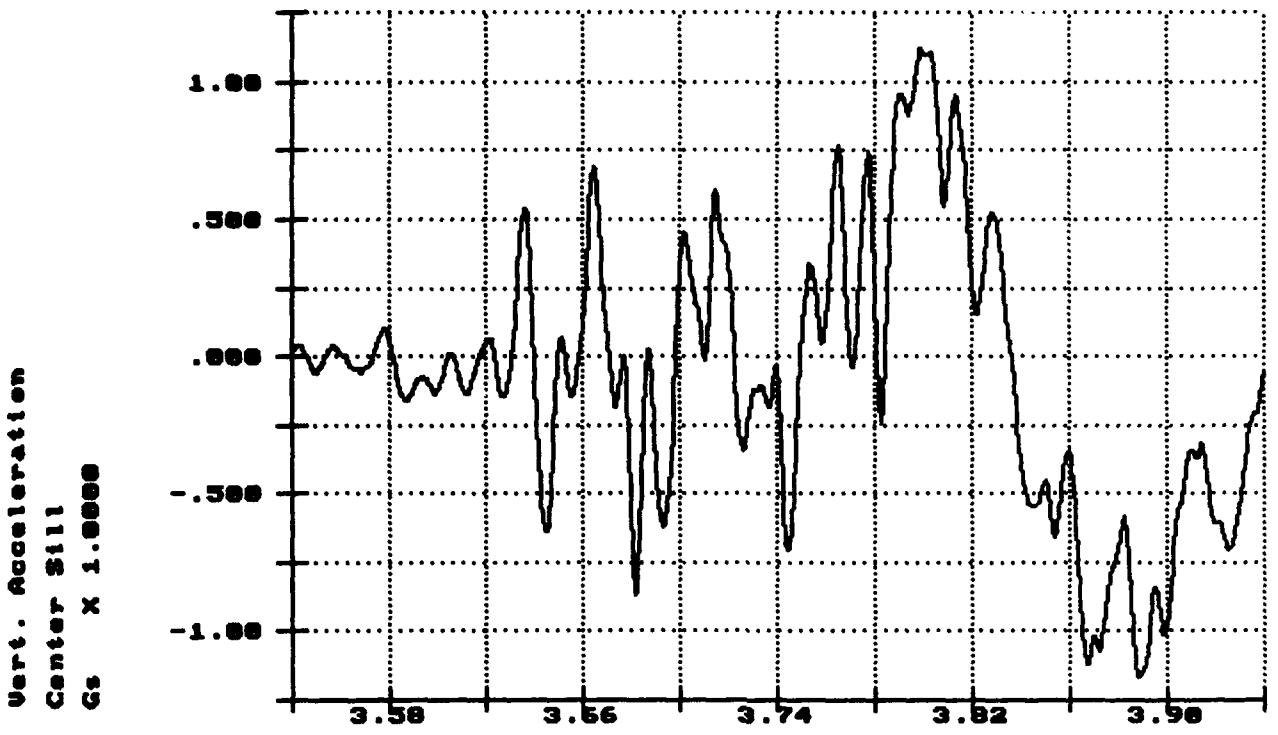
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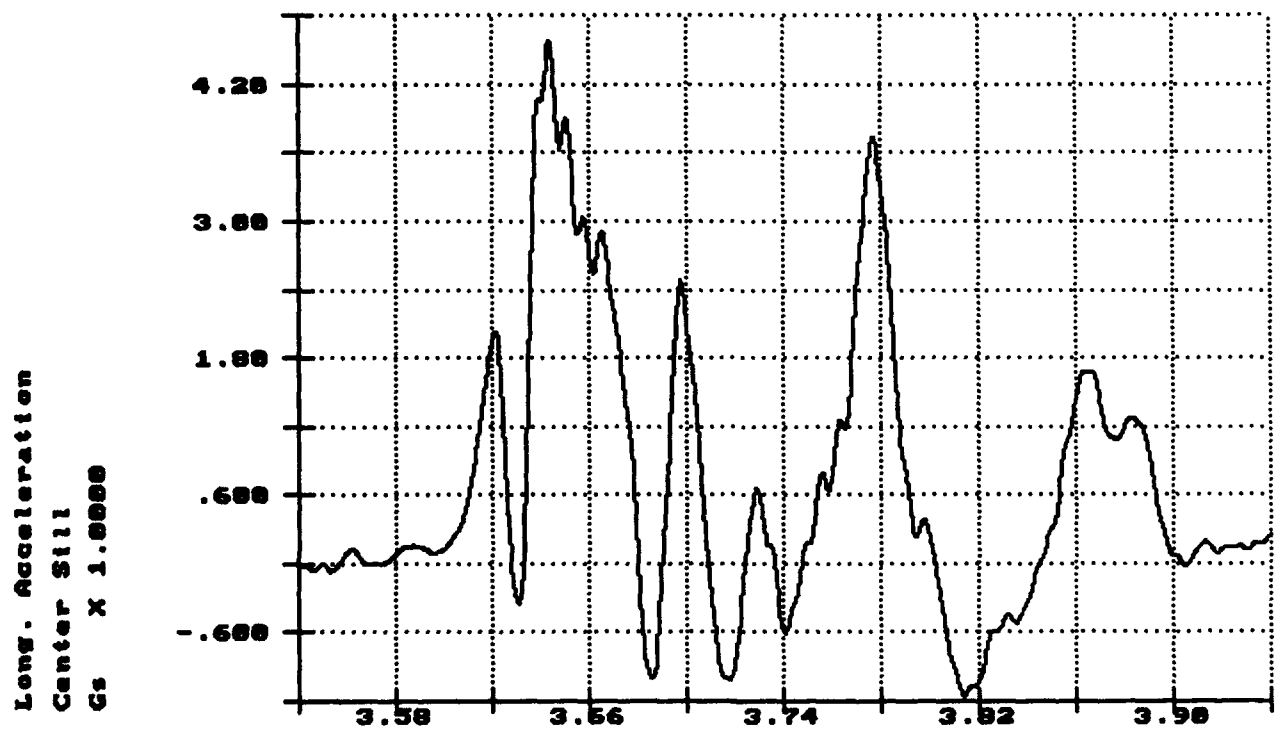
R.I. of PLS Flatracks, Impact 4: 9.38MPH Nov 16 09:29:36 1993



R.I. of PLS Flatracks, Impact 4: 9.38MPH Nov 16 09:29:36 1993



R.I. of PLS Flatracks, Impact 4: 9.38MPH Nov 16 09:29:36 1993



TEST NO. 2

RAIL IMPACT DATA

Test No.: 2 Date: 16 November 1993

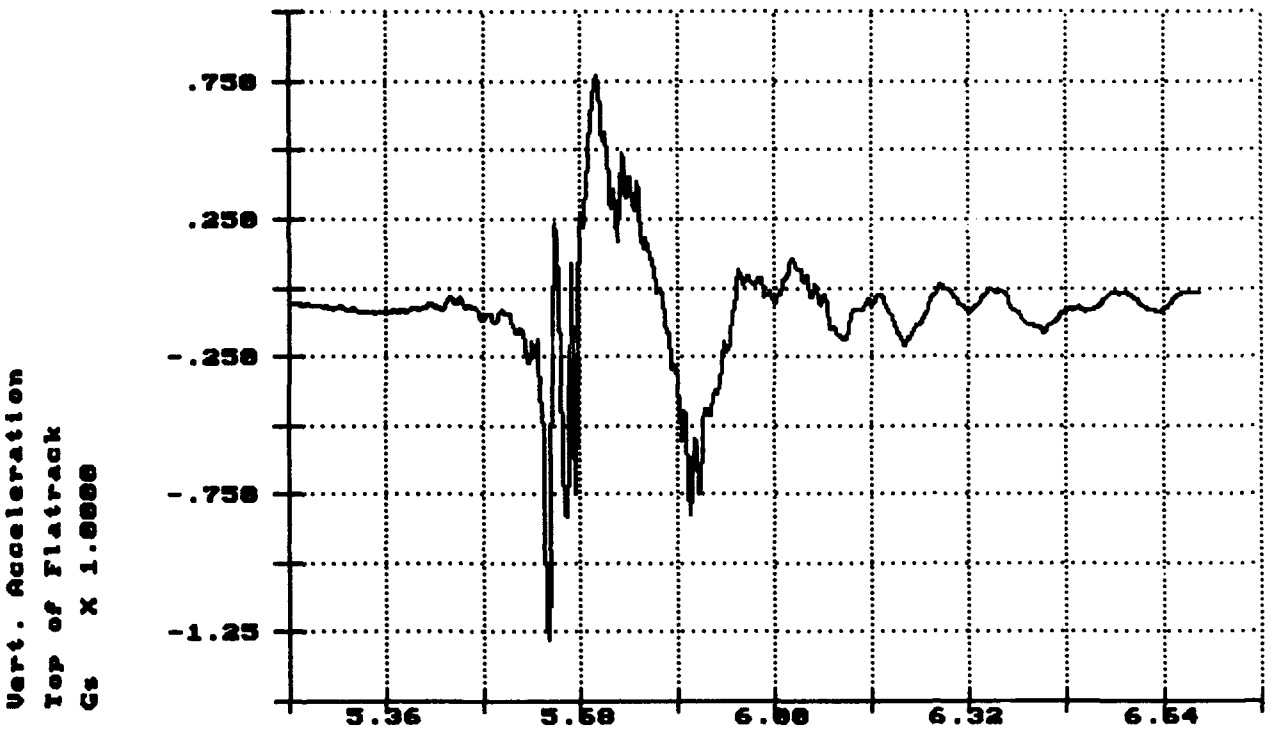
Specimen Loads: EPF with 155MM SLPs and 120MM Tank Ammunition on Metal Pallets on a TOFC railcar.

Flatcar No.: TTWX 975424	Lt. Wt.:	73,000
Trailer Chassis No.: ISCZ 164587	Wt.:	6,540
EPF No. 1	Wt.:	7,500
Lading, 120MM Tank Ammunition on Metal Pallets	Wt.:	24,000
Trailer Chassis No.: 5394	Wt.:	6,500
EPF No. 2	Wt.:	7,500
Lading, 155MM SLPs	Wt.:	28,000
	Total Specimen Wt.:	157,040
	Buffer Car (five cars) Wt:	250,000

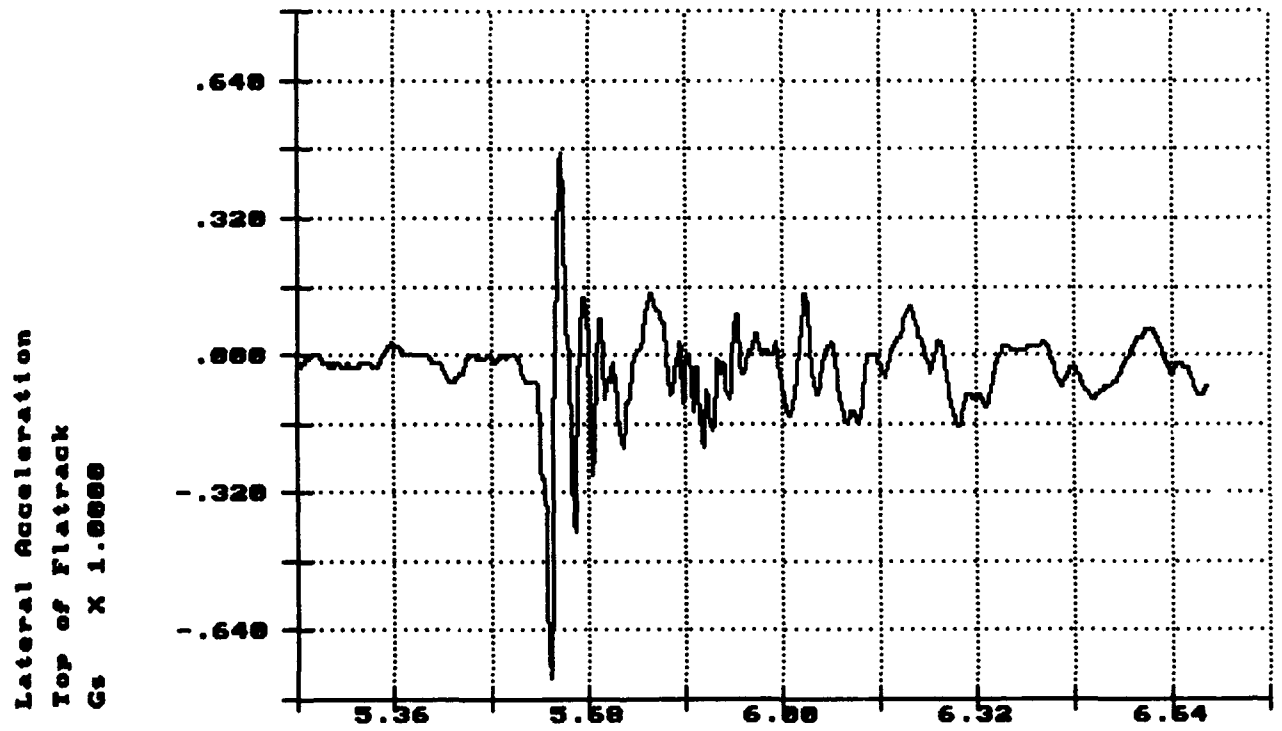
Impact	End Struck	Velocity	Remarks
1	Rear	4.49	120MM load - 2-inch gap at top of pallet and end wall, 1-inch gap at pallet base and end wall. 155MM load - 3/4-inch uniform gap top to bottom to EPF end wall.
2	Rear	6.36	No change in either load.
3	Rear	8.73	No change in either load.
4	Forward	8.82	Load shifted on both pallets: 120MM load - 2-inch gap at top of pallet and end wall, 1-inch gap at pallet base and end wall. 155MM load - 3/4-inch uniform gap top to bottom to EPF end wall.

During impact, it was observed that the top of the EPF end walls displaced approximately two to three inches in the direction of impact. No permanent deformation was observed in the EPF or load after TOFC rail impact testing.

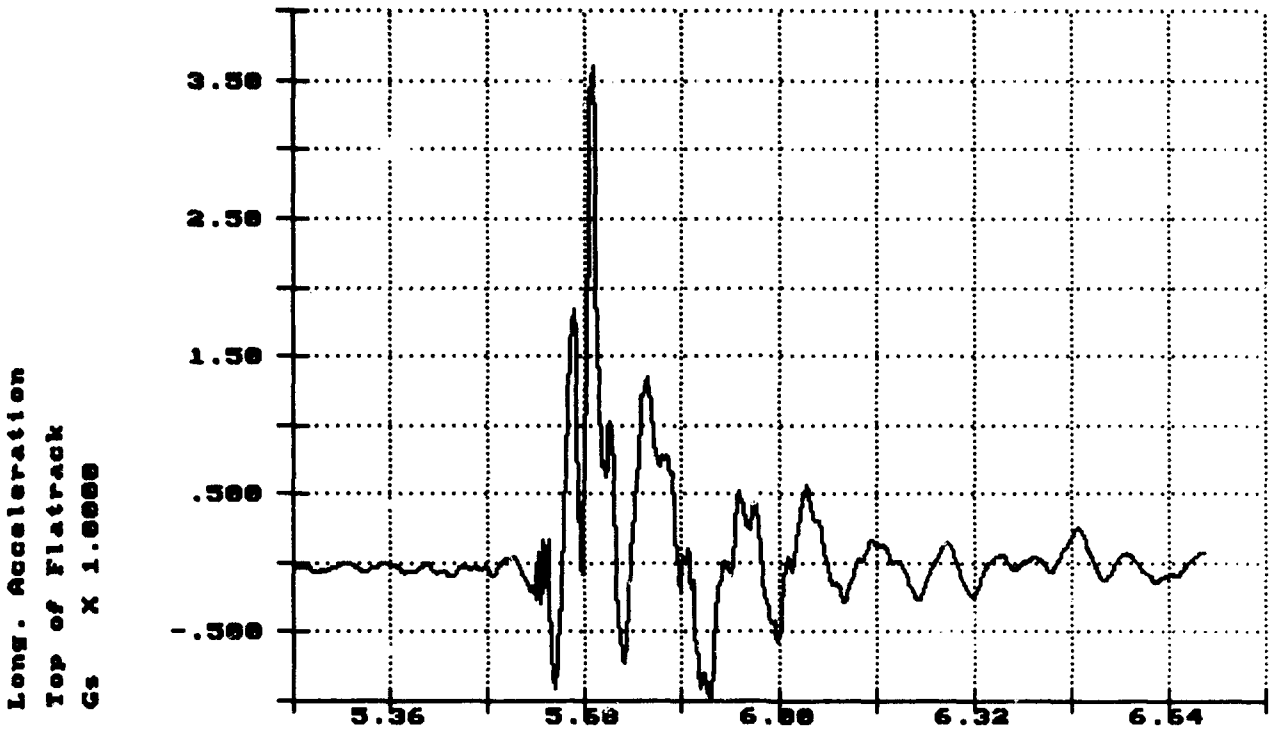
R.I. of PLS Flatracks, Impact 1: 4.49MPH Nov 16 13:29:01 1993



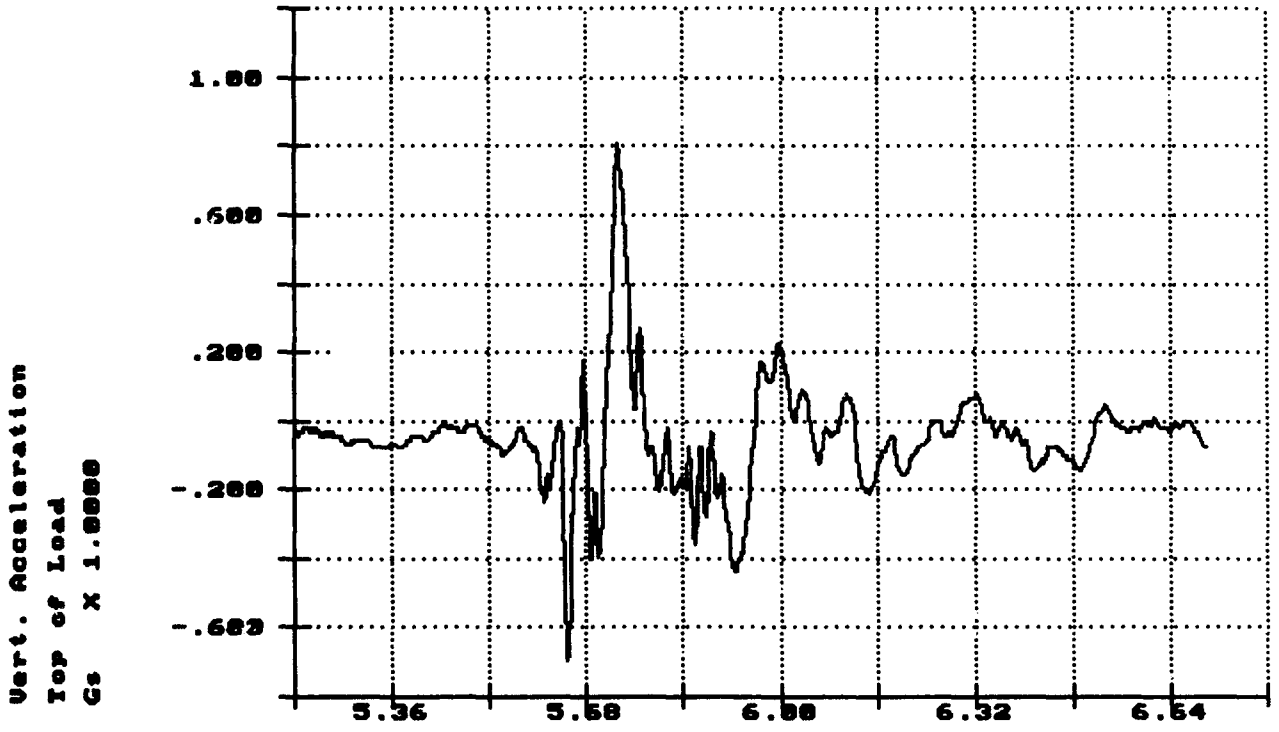
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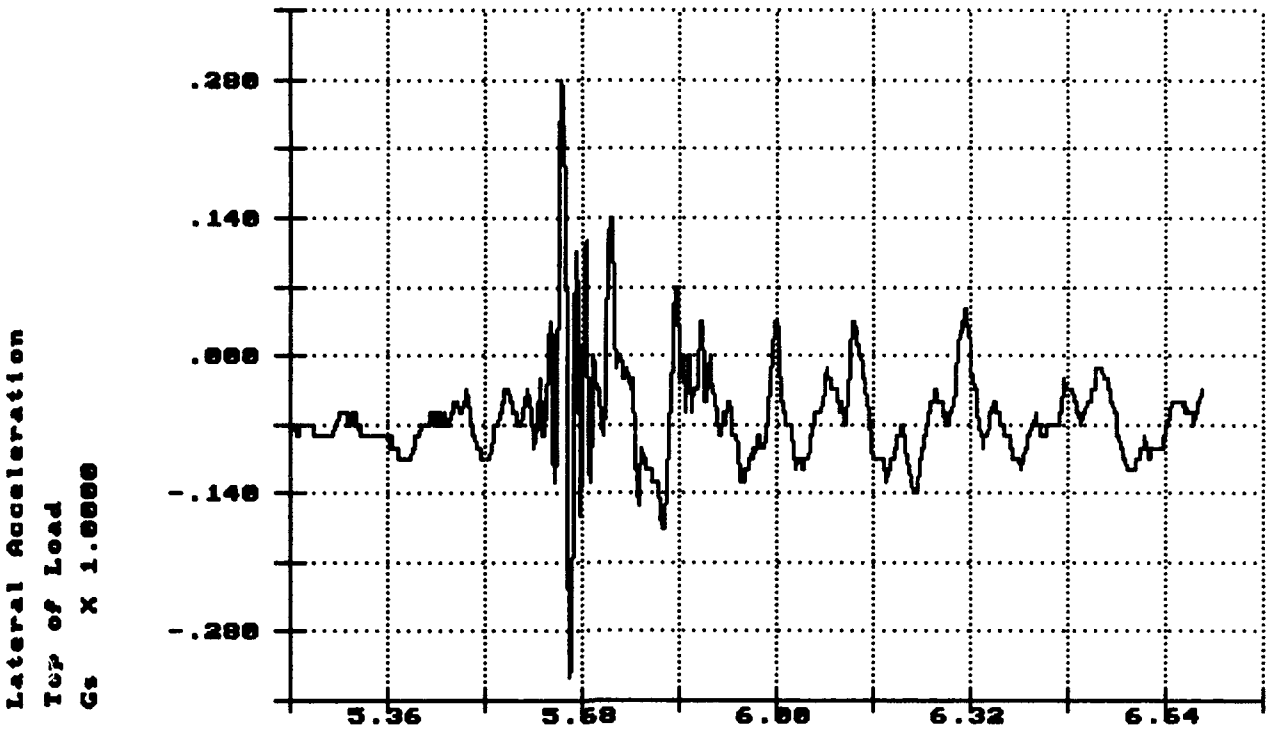
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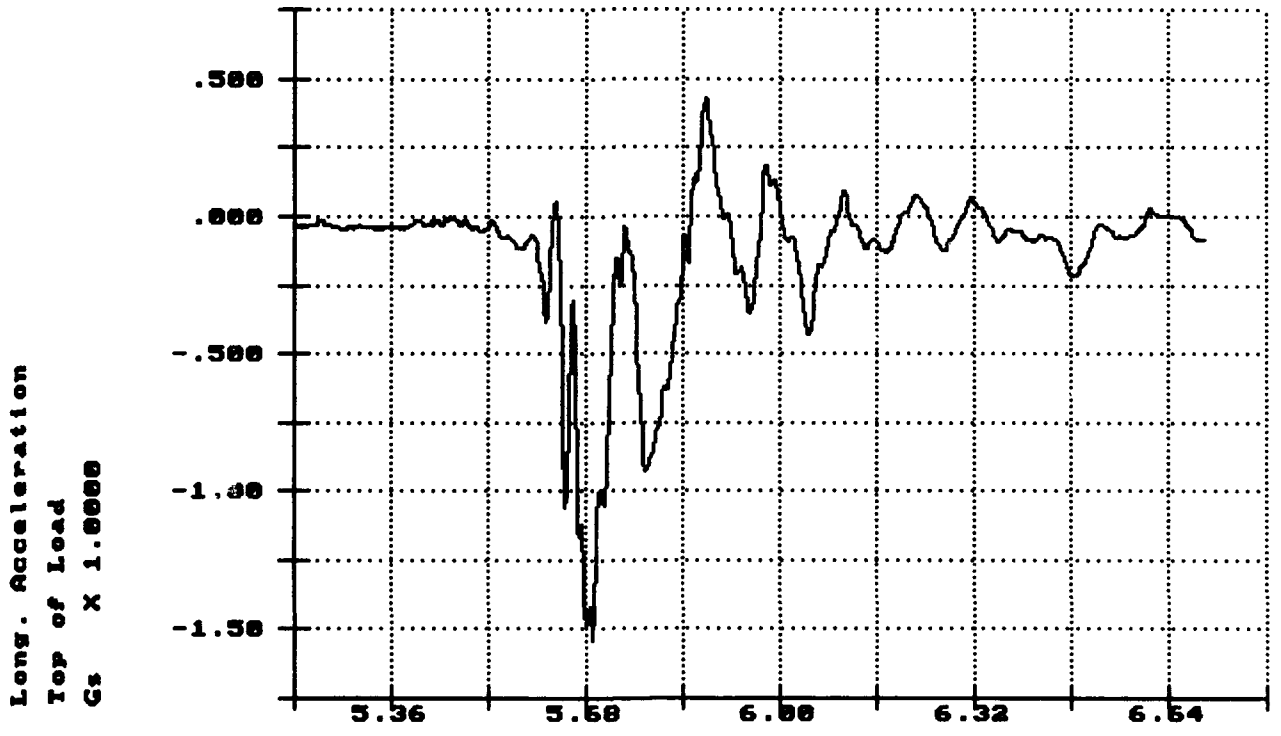
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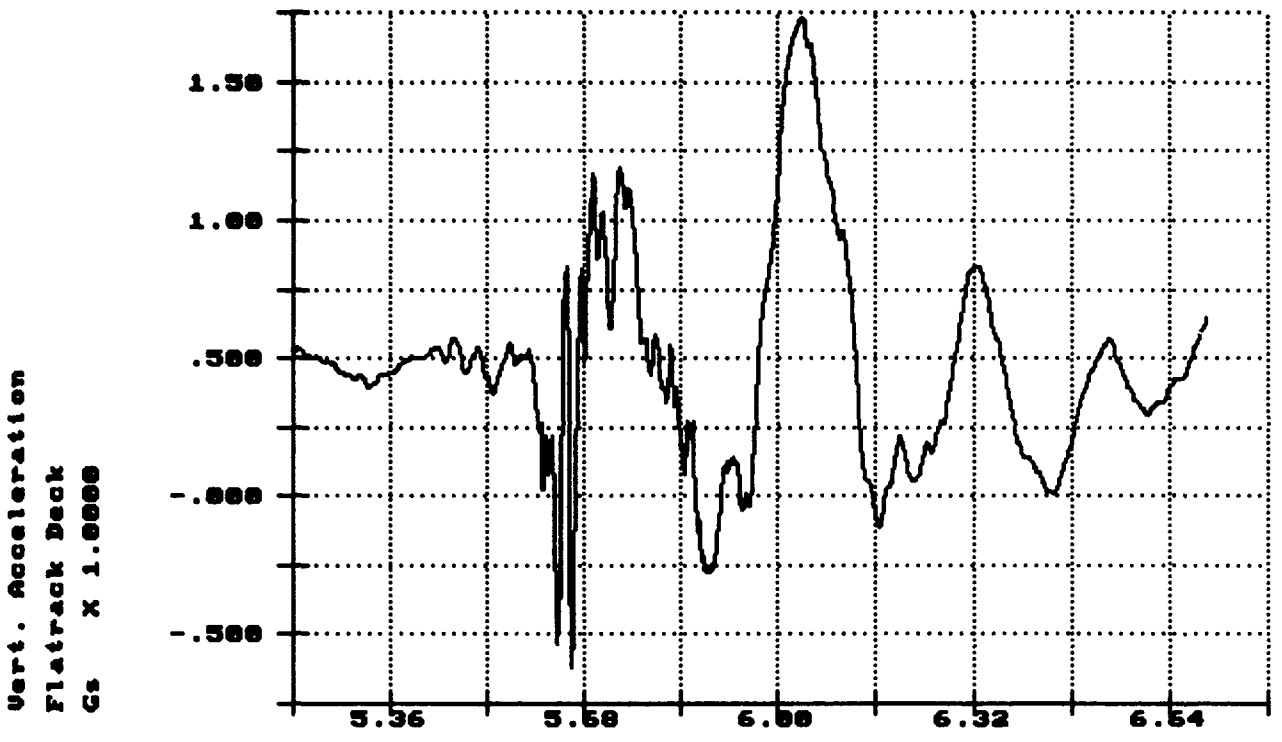
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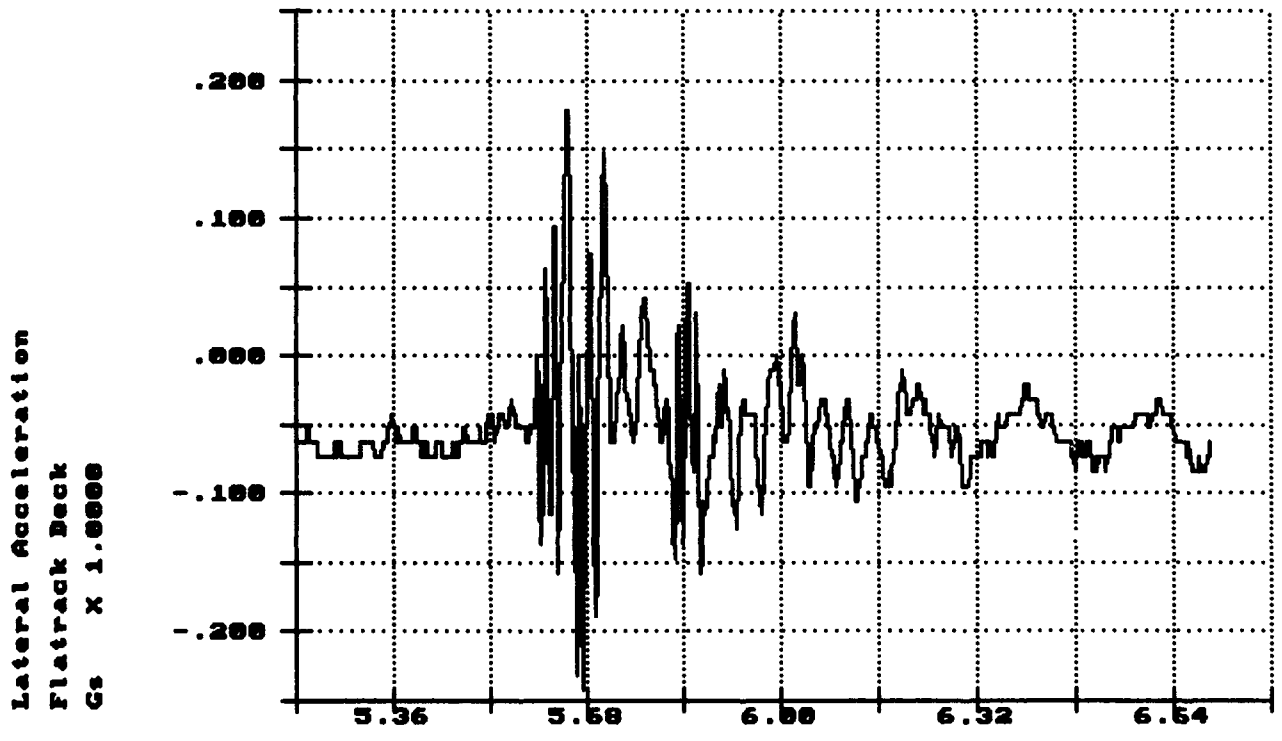
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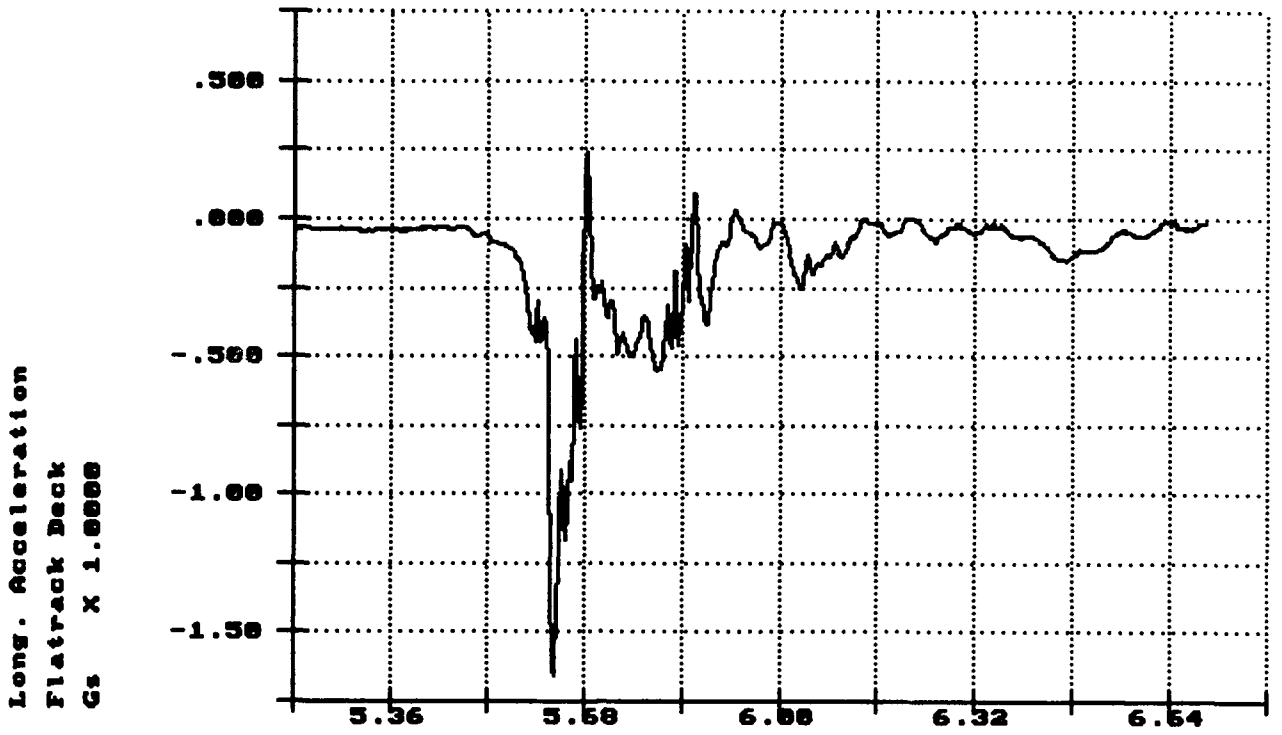
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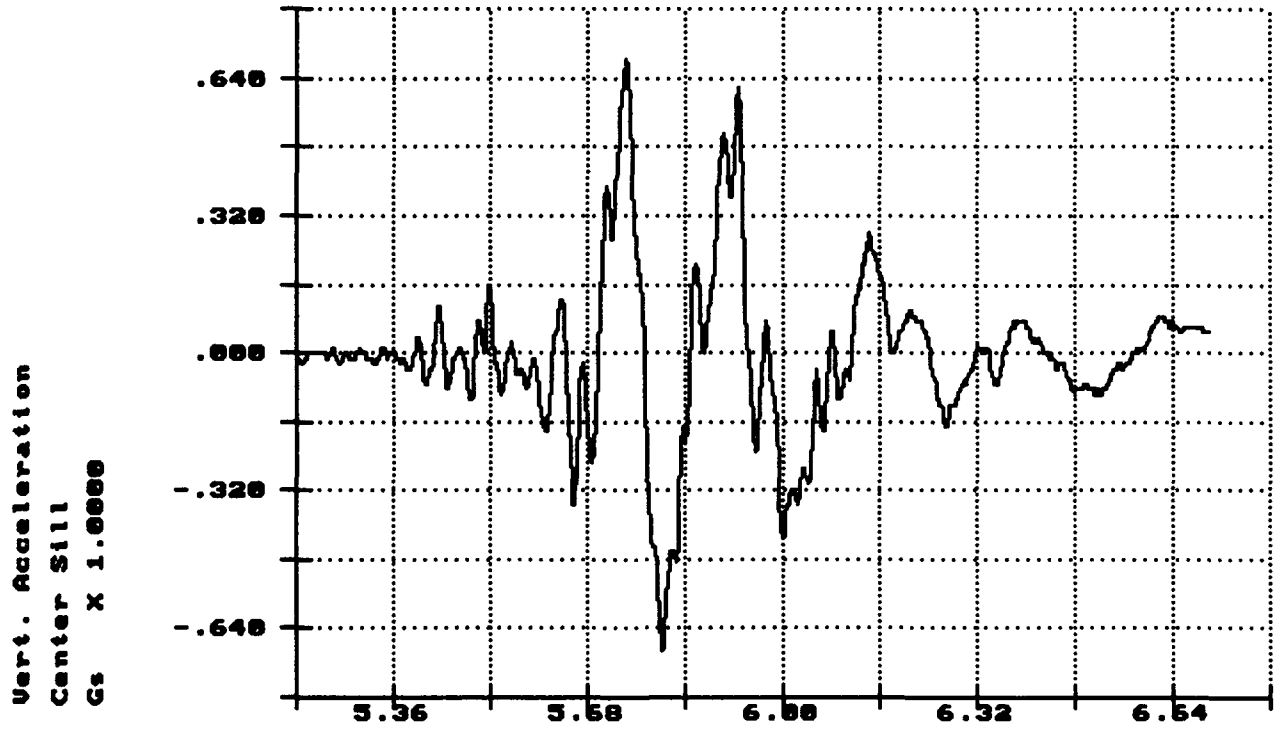
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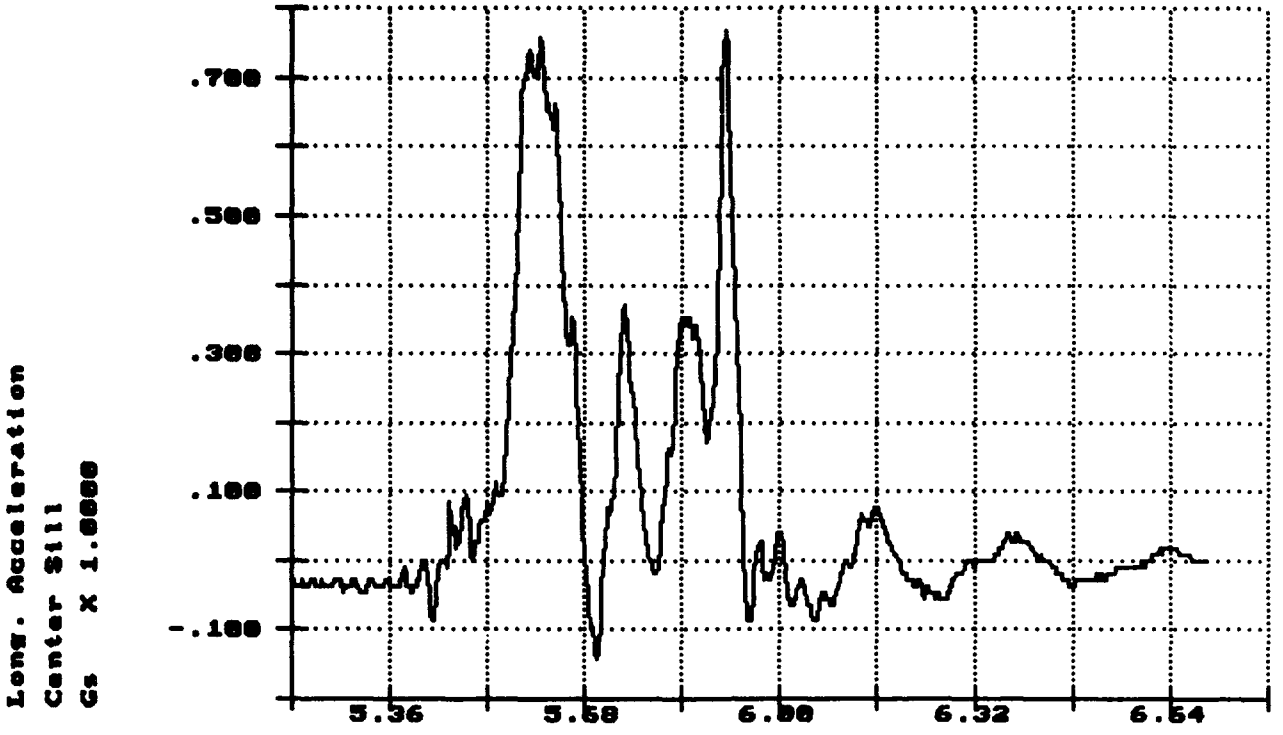
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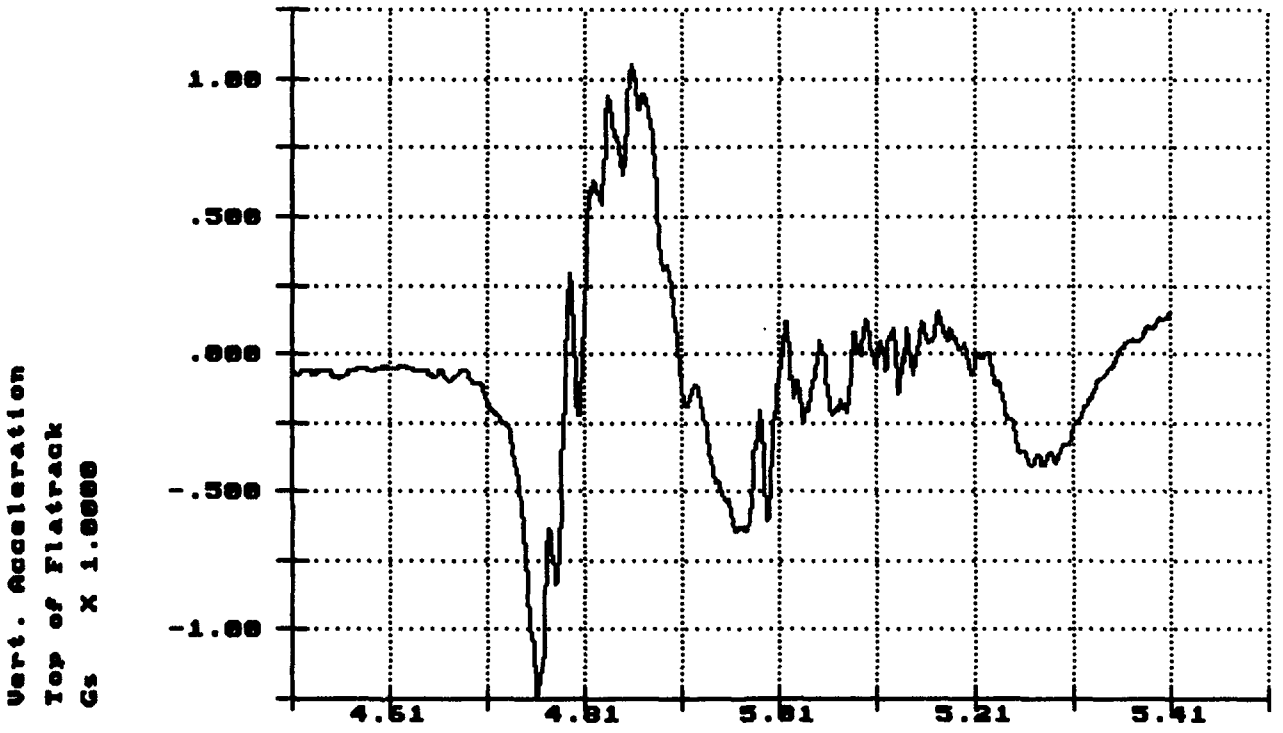
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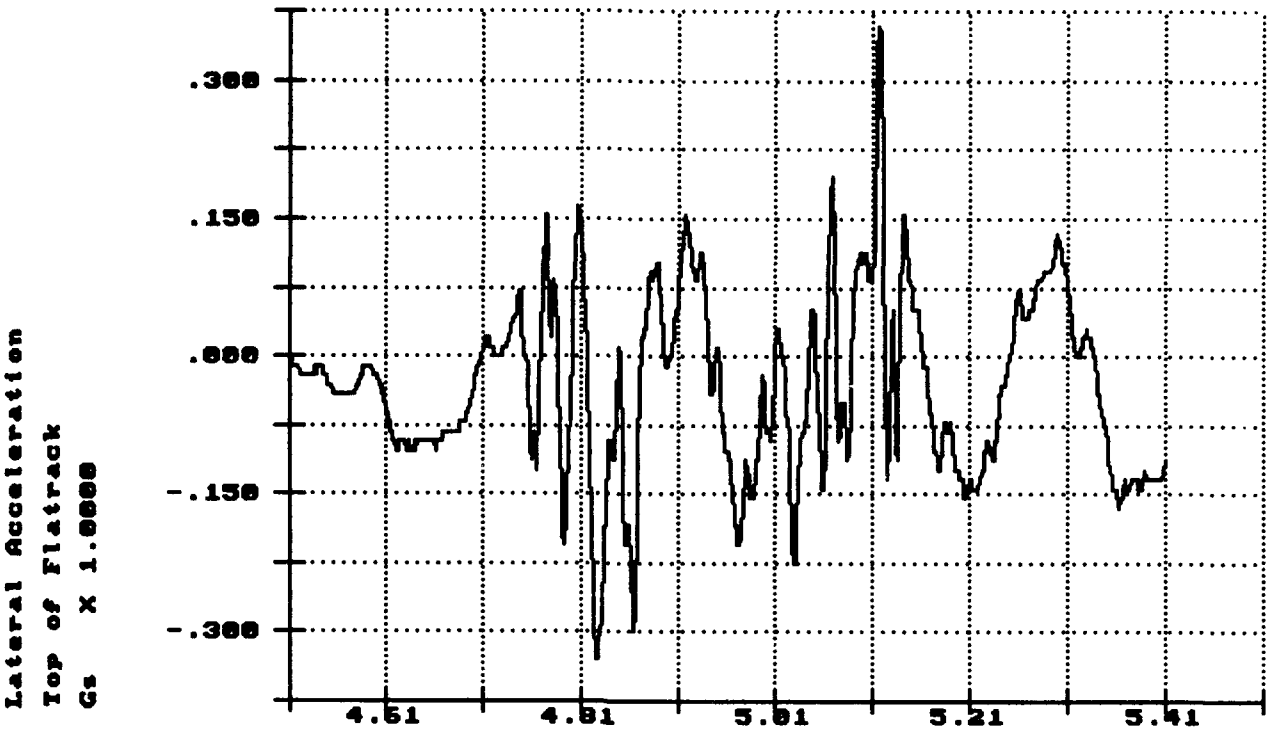
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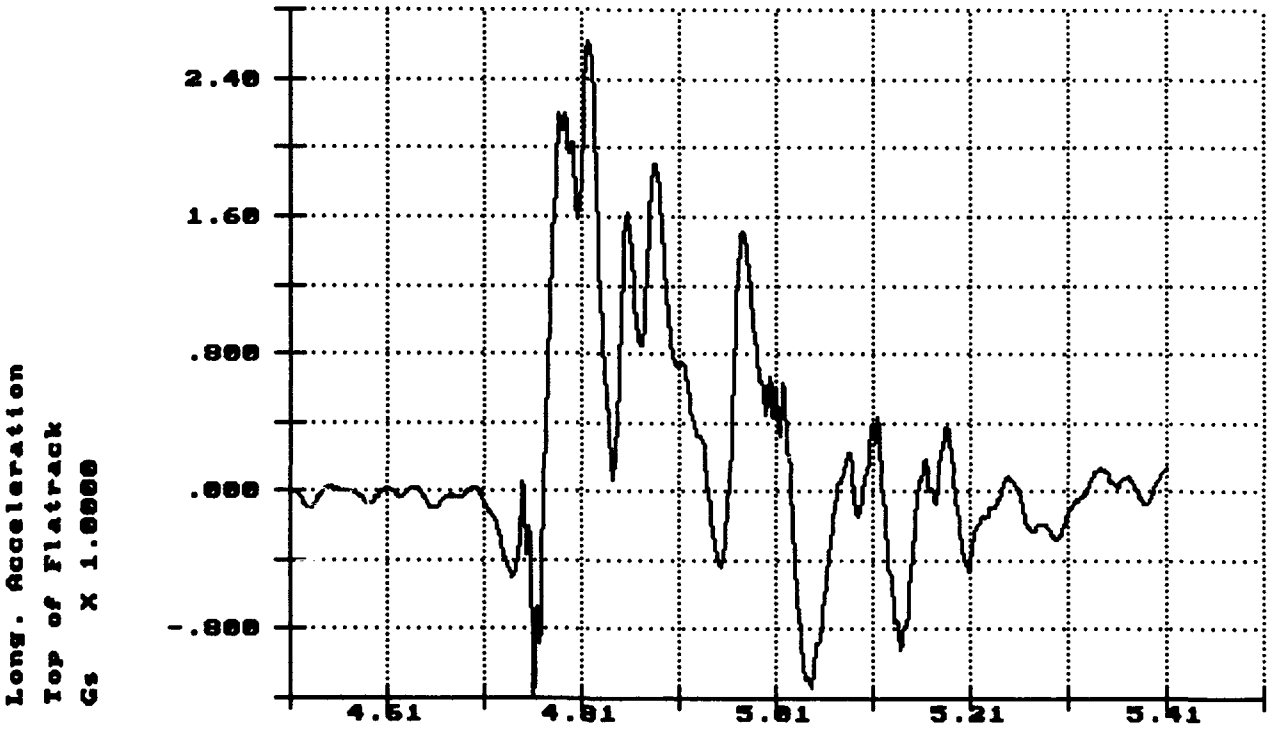
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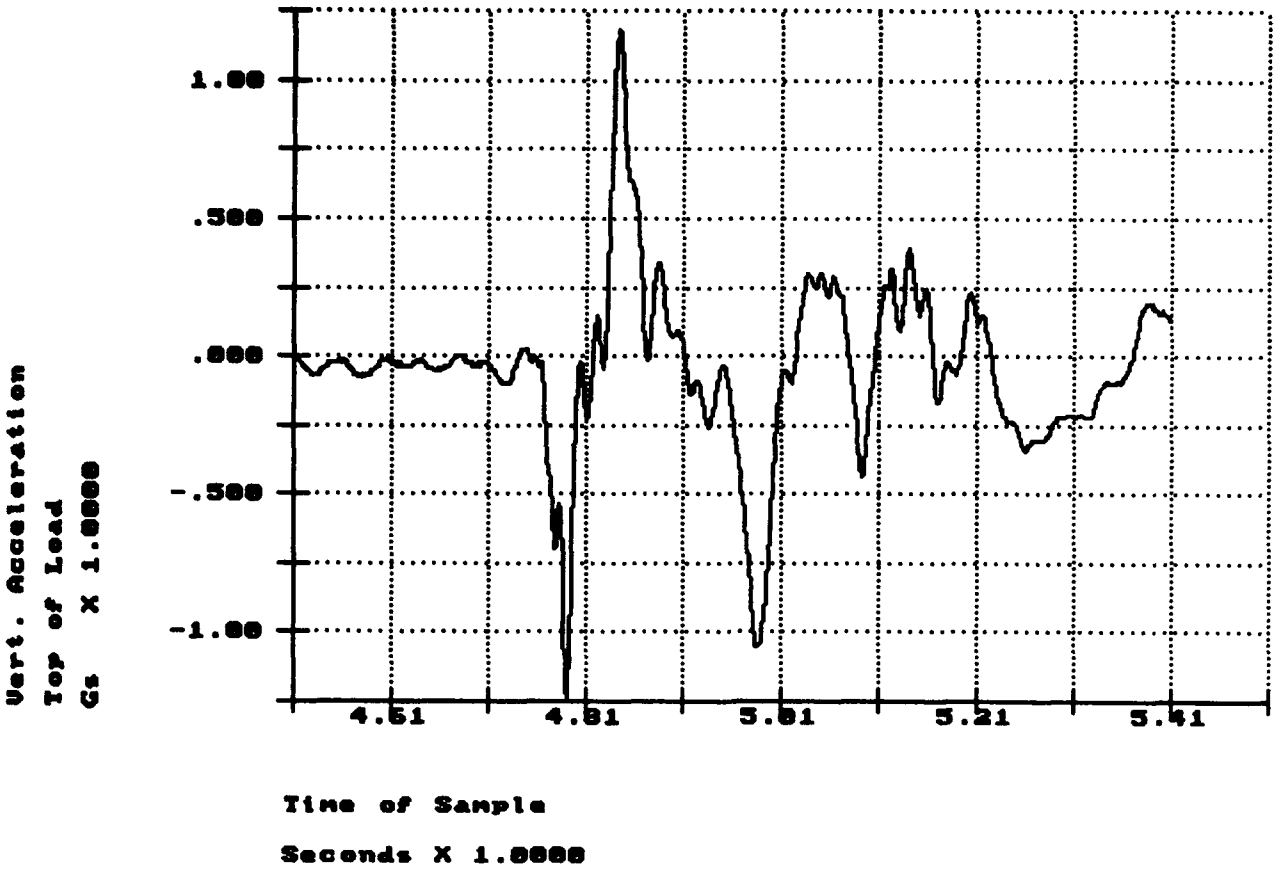
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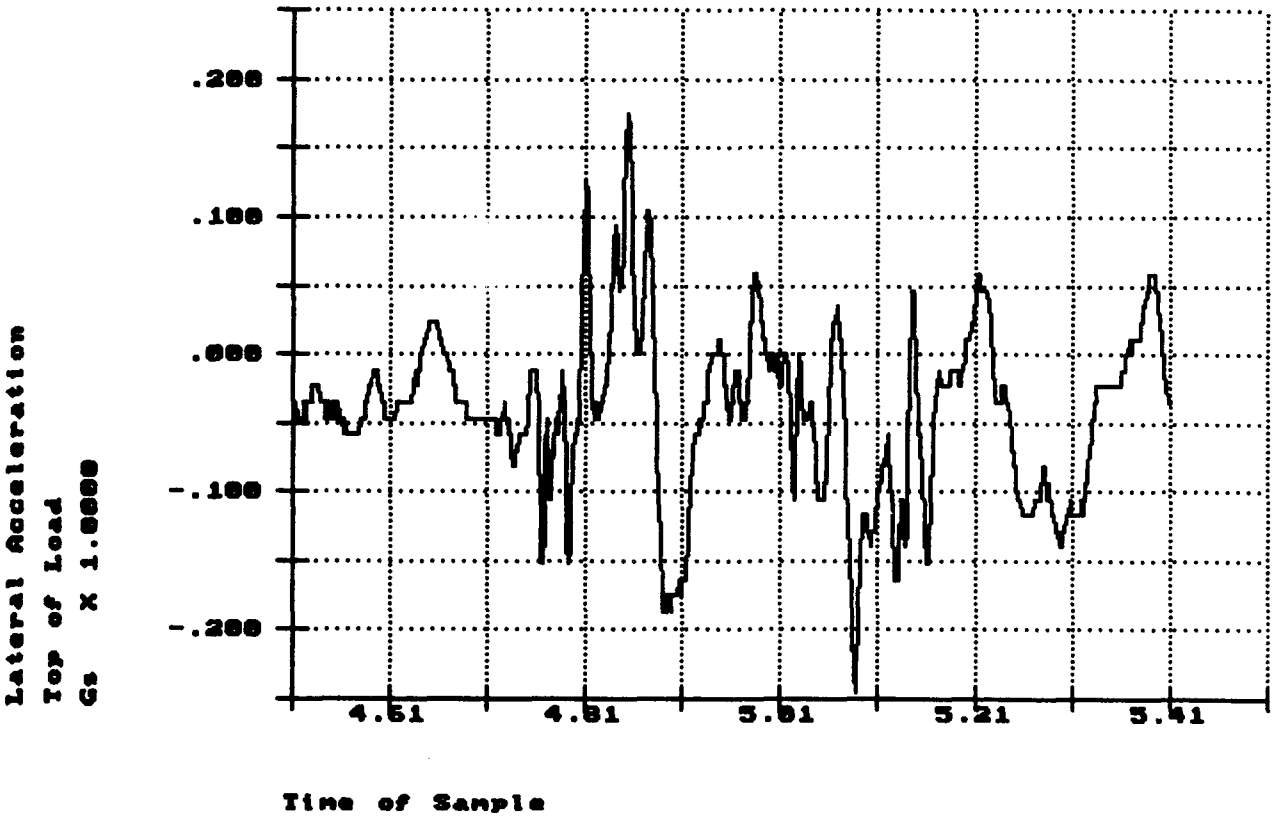
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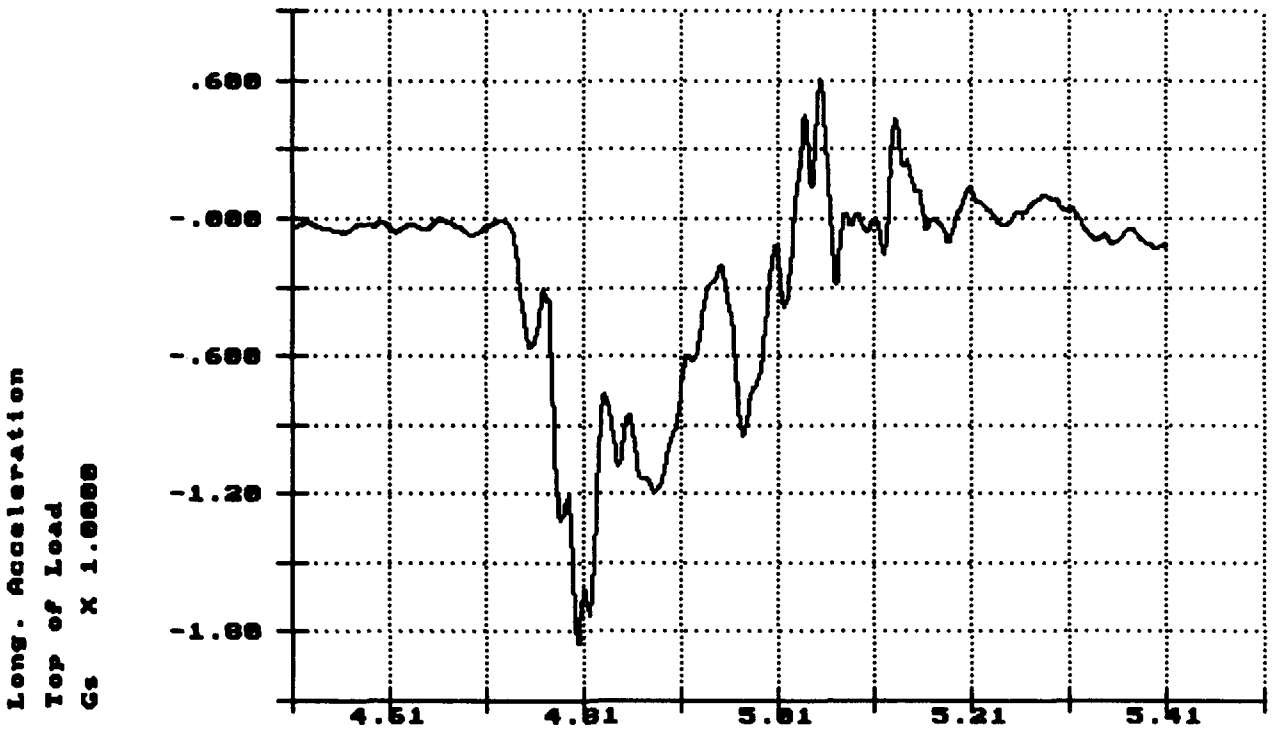
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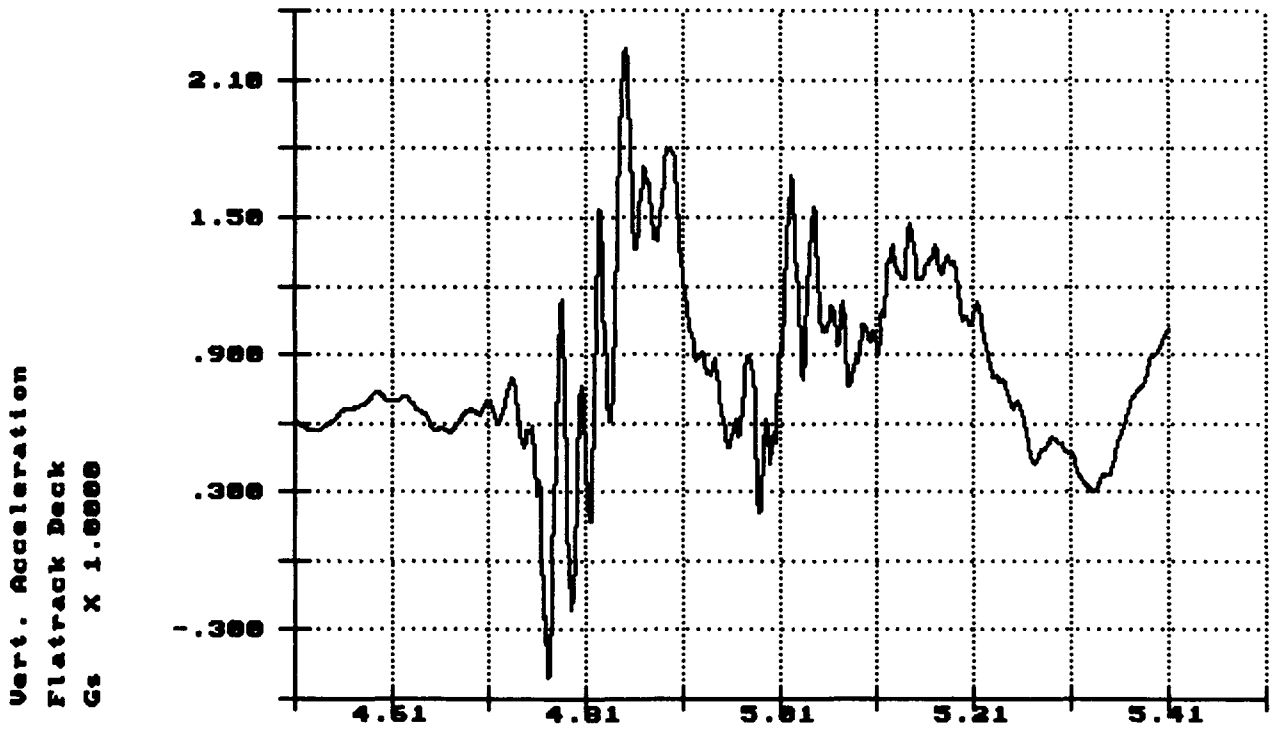
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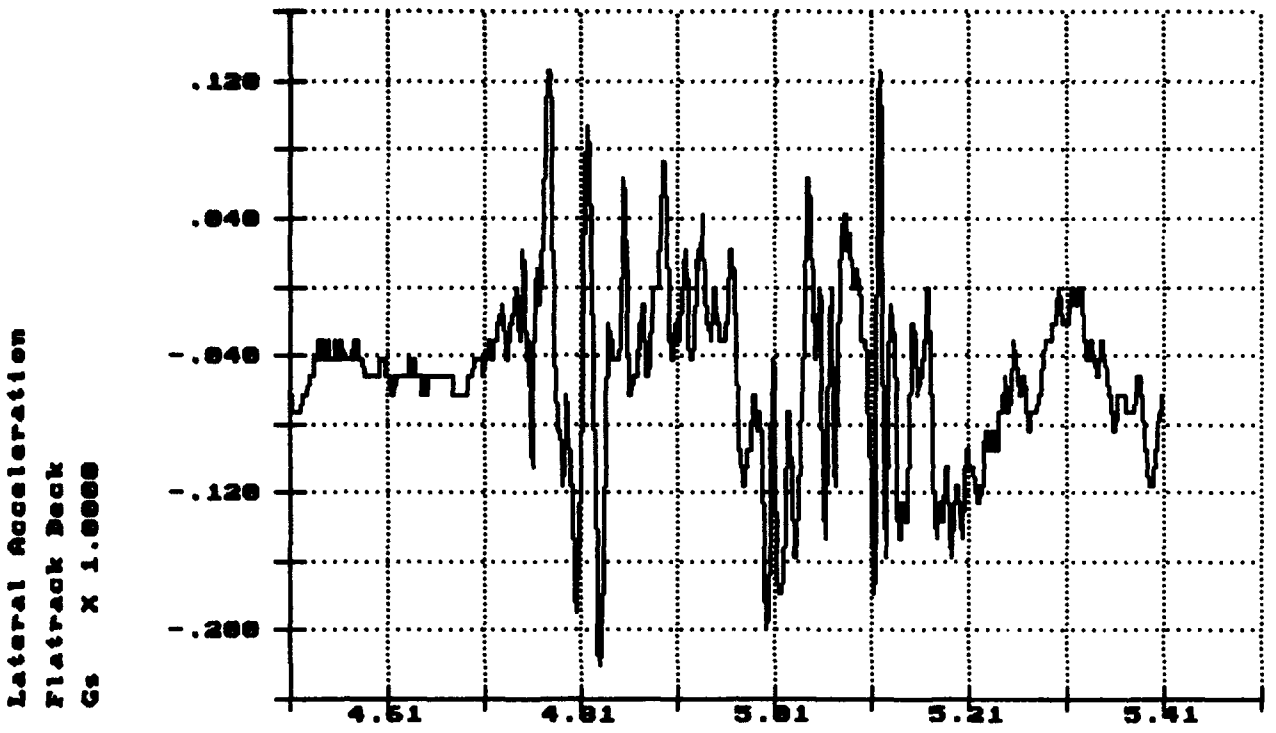
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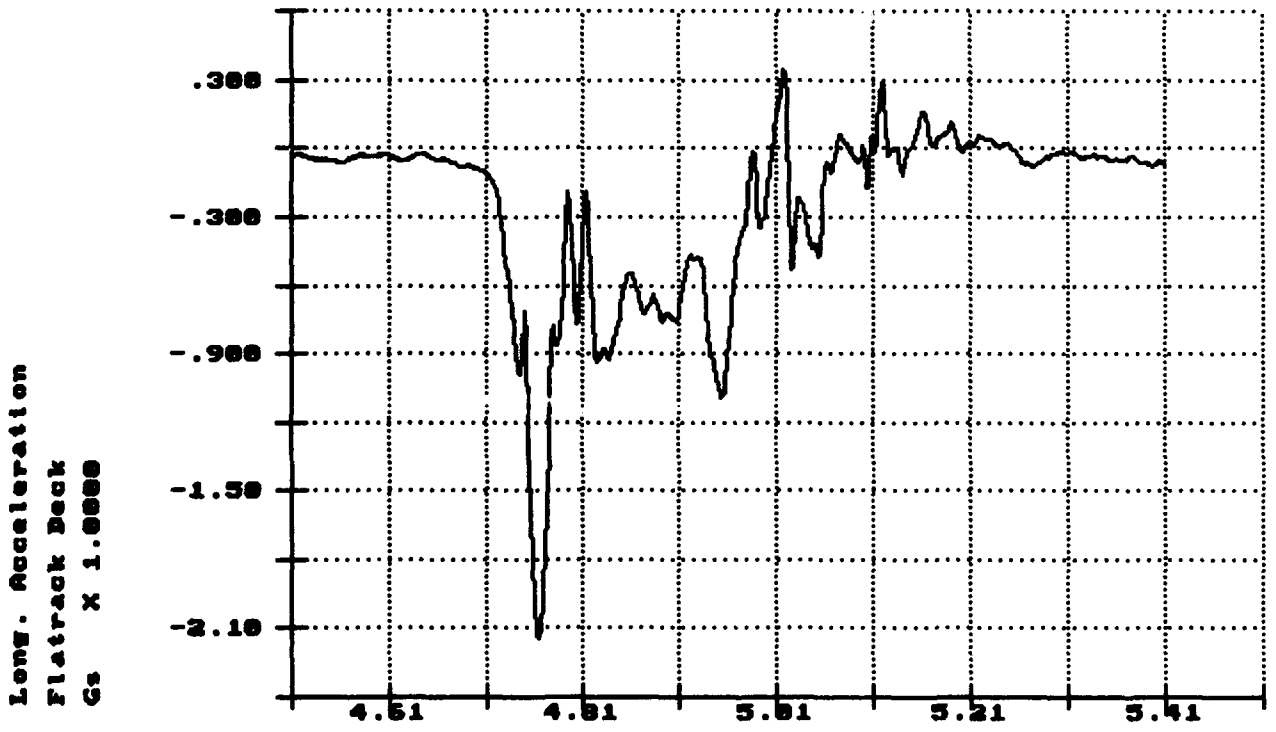
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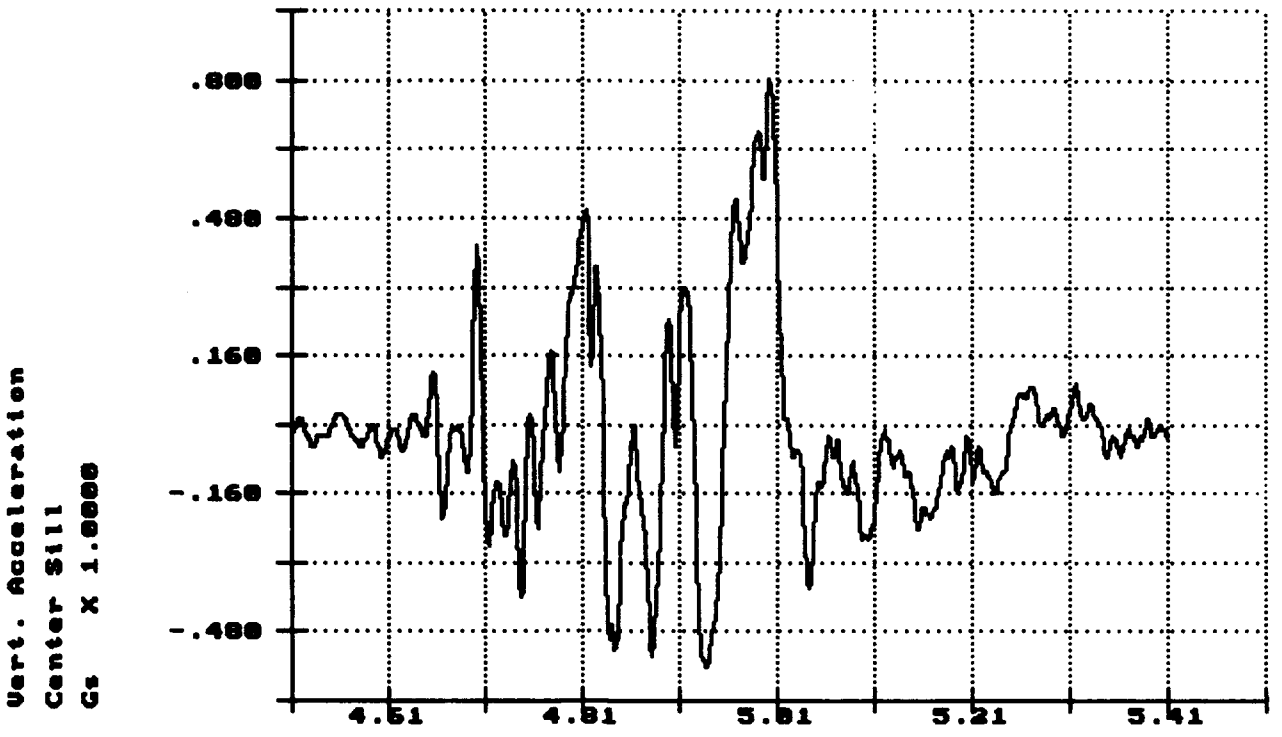
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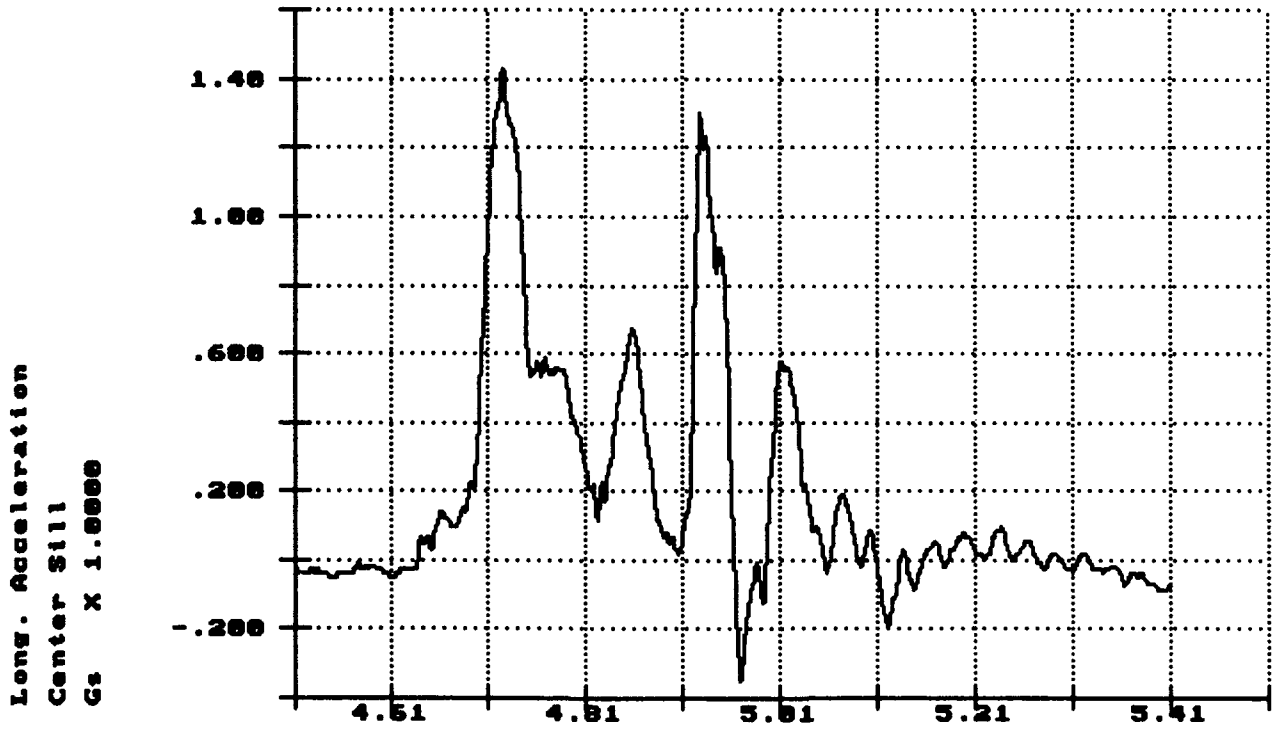
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Seconds X 1.0000

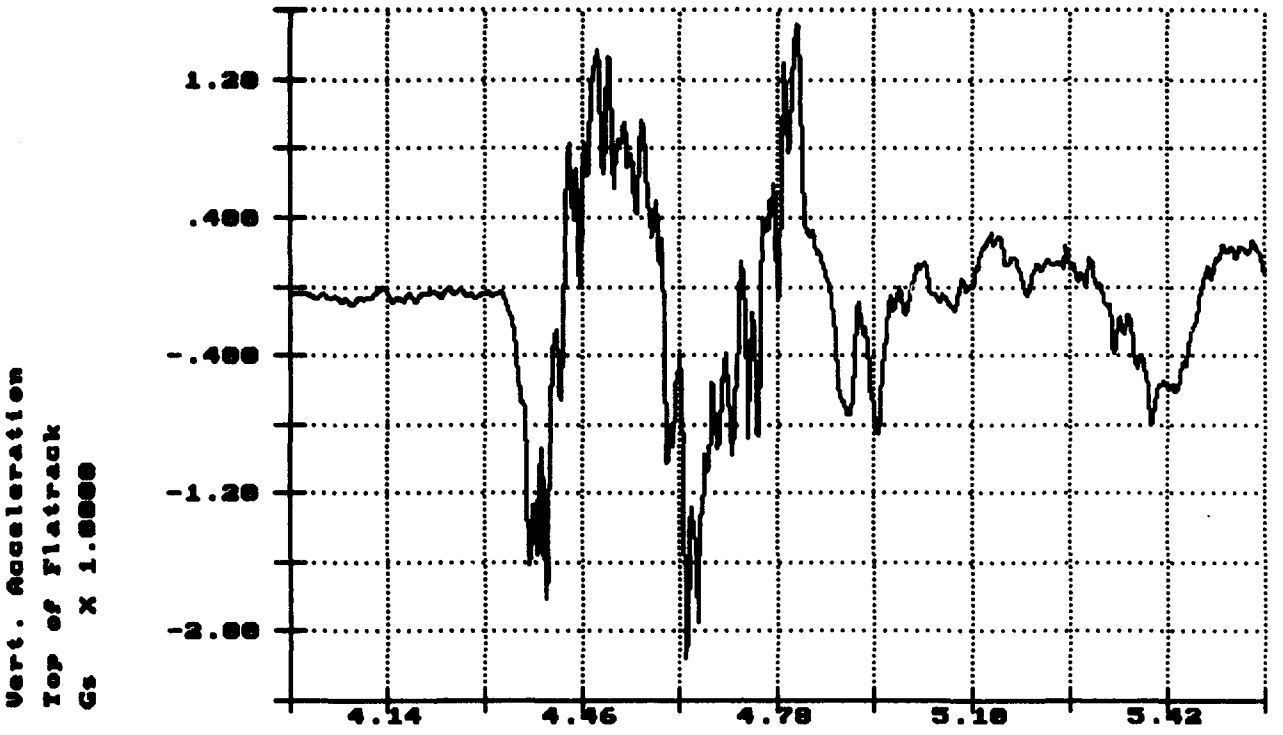
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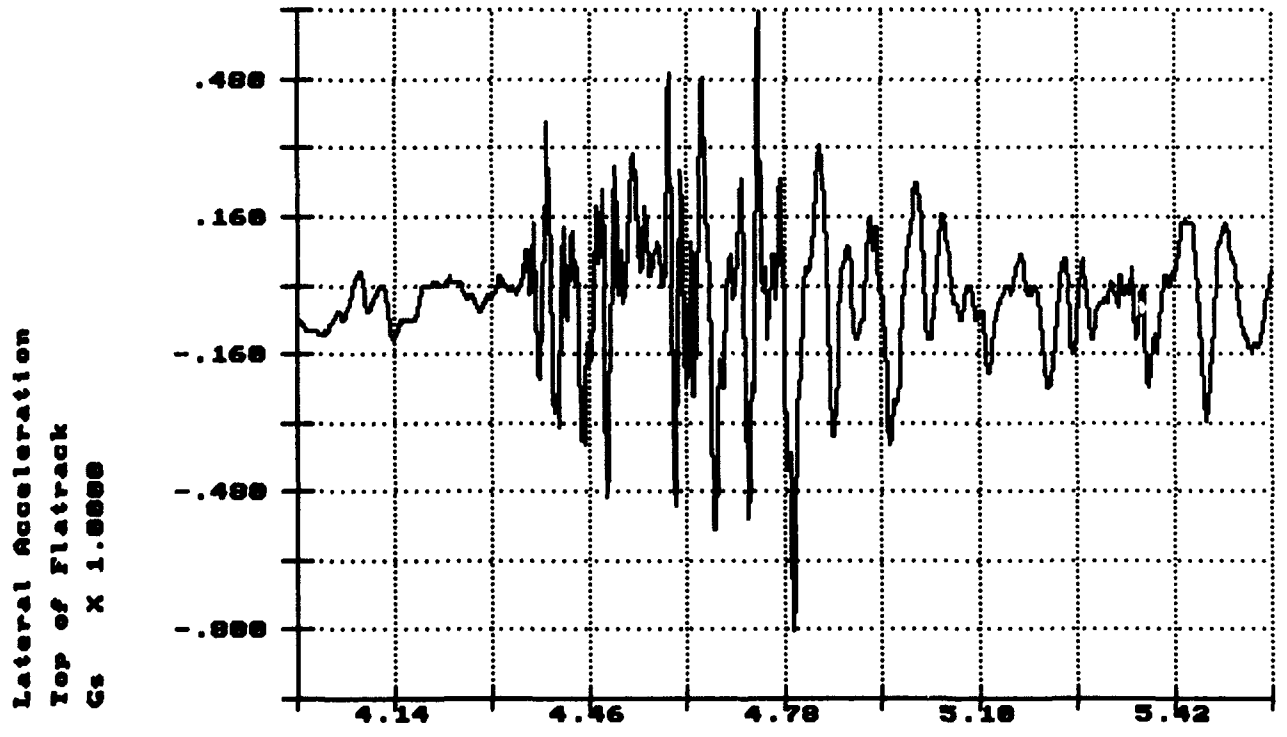
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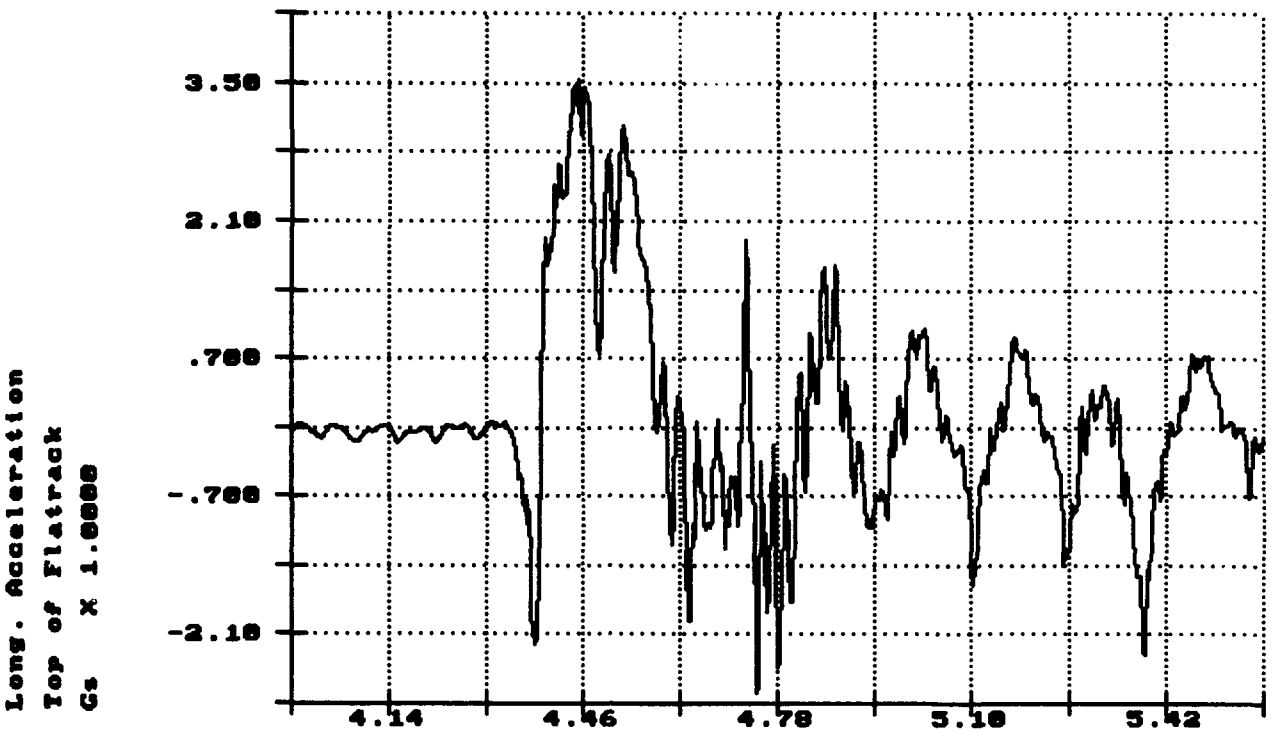
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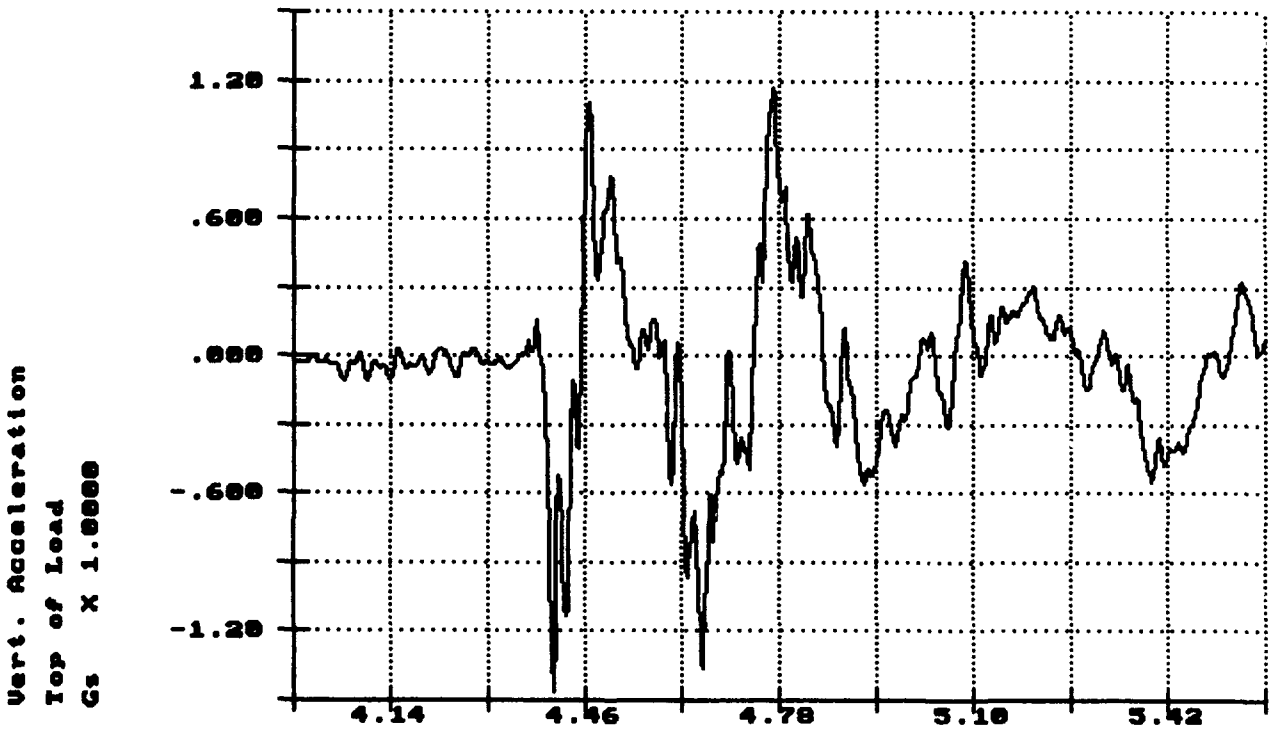
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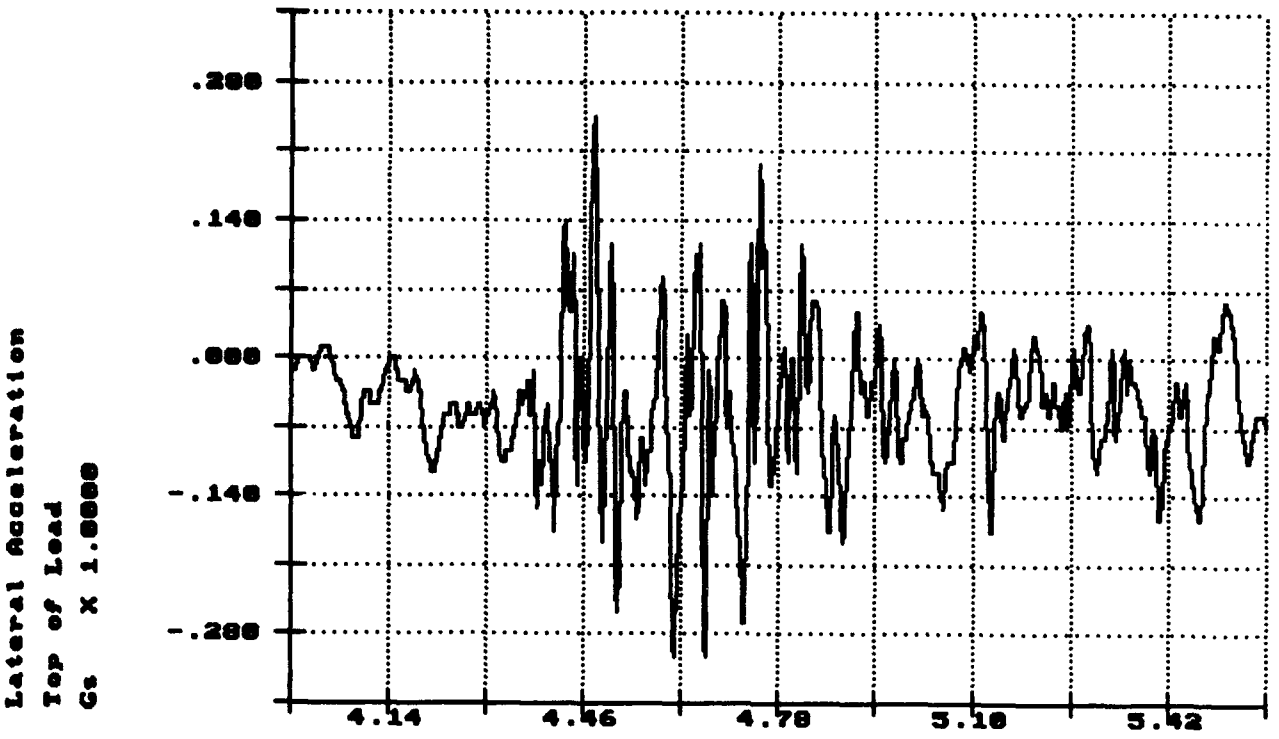
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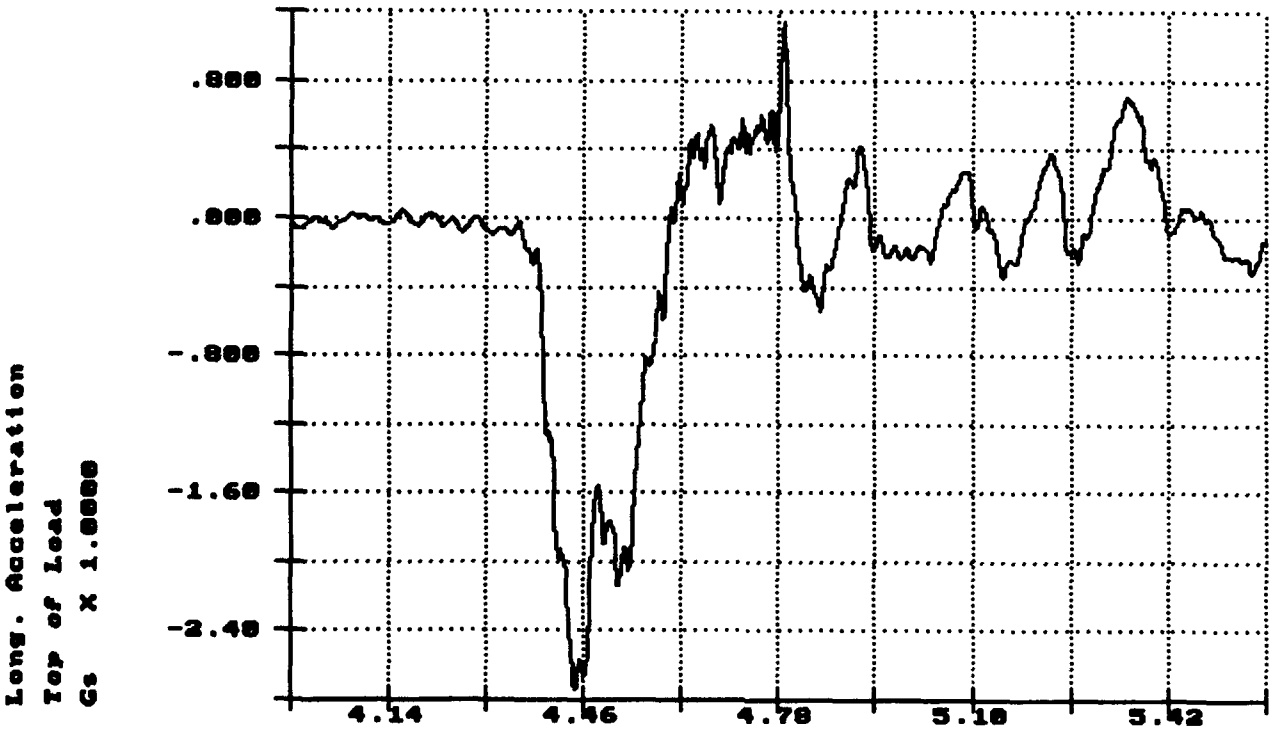
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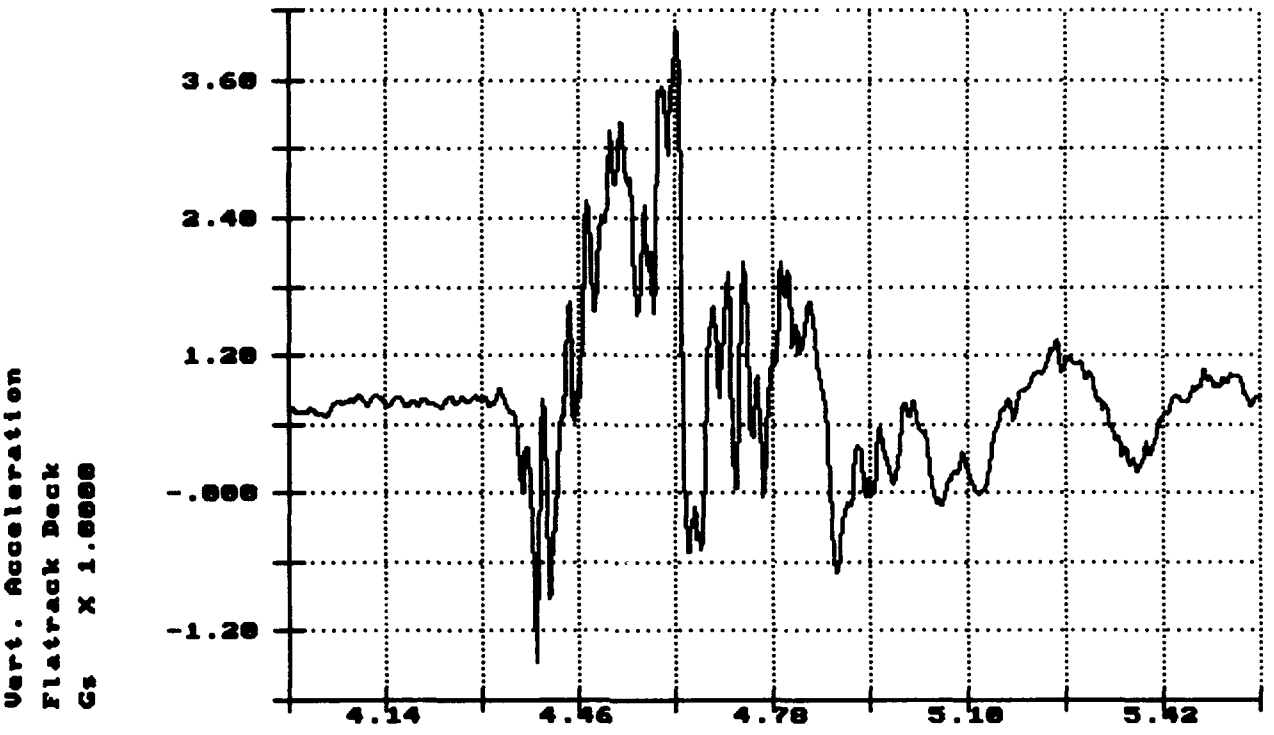
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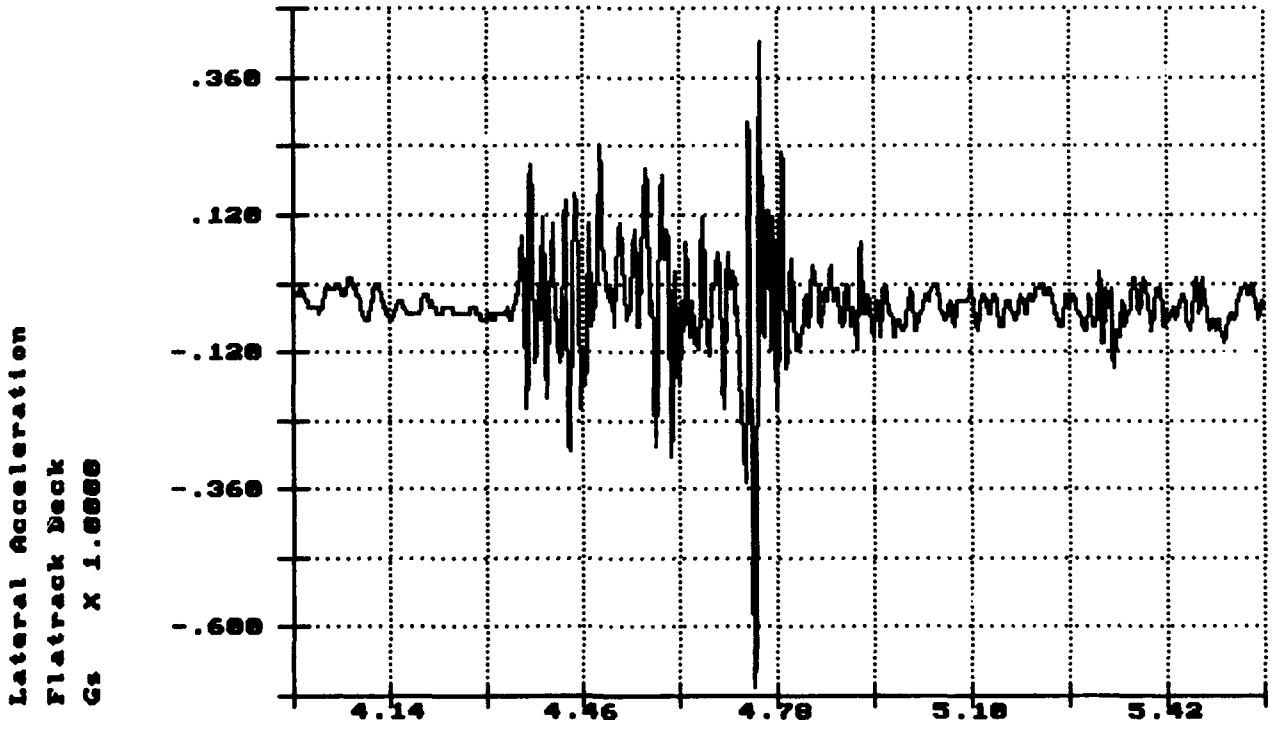
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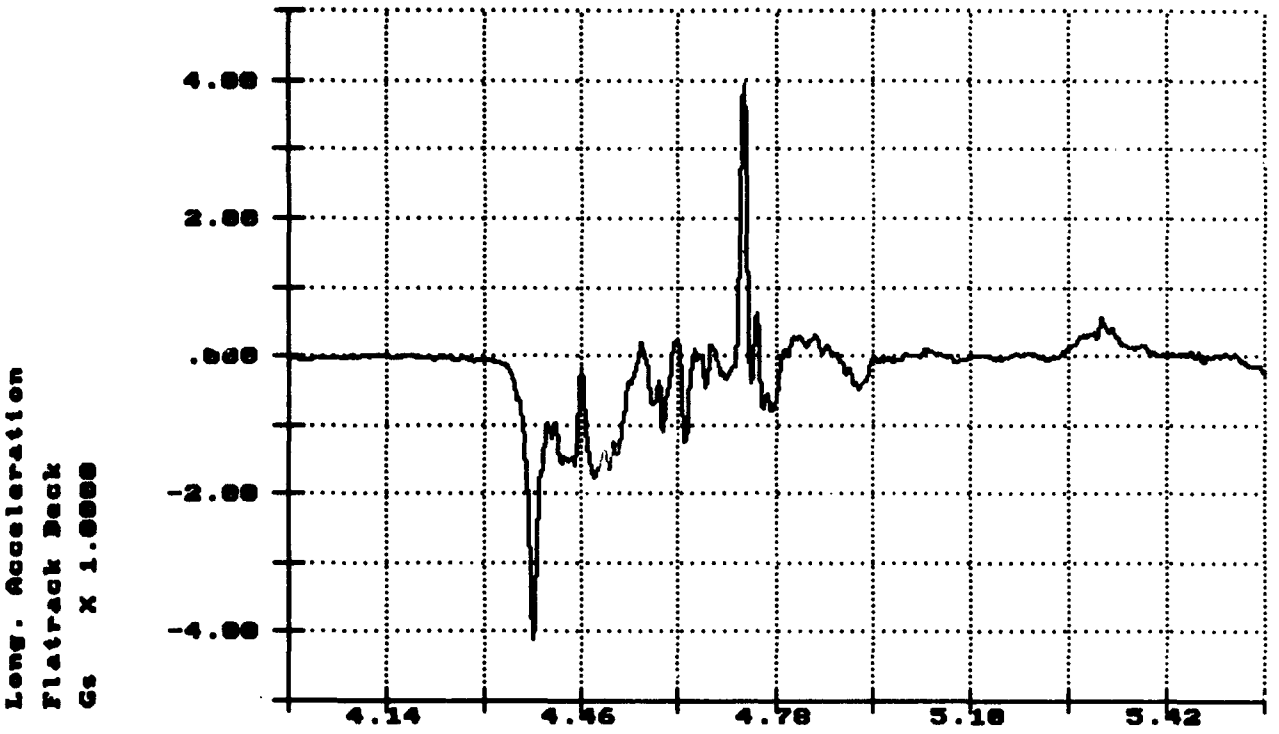
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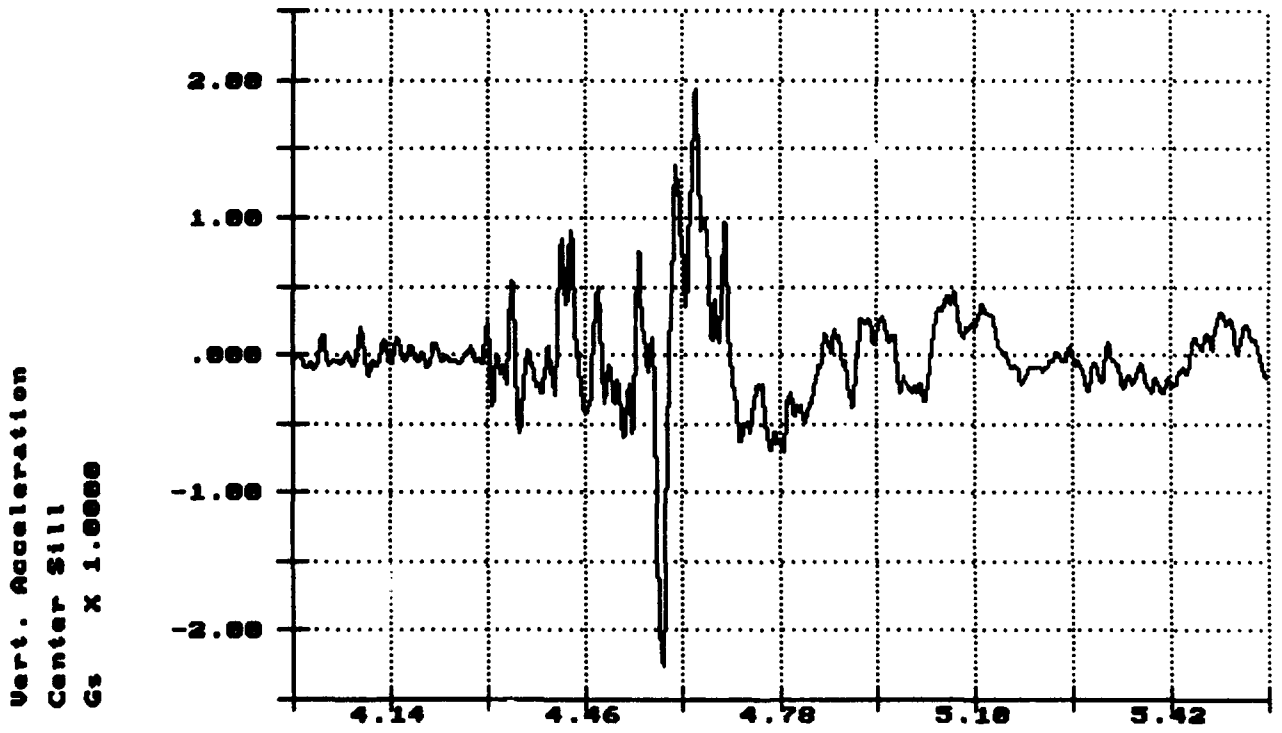
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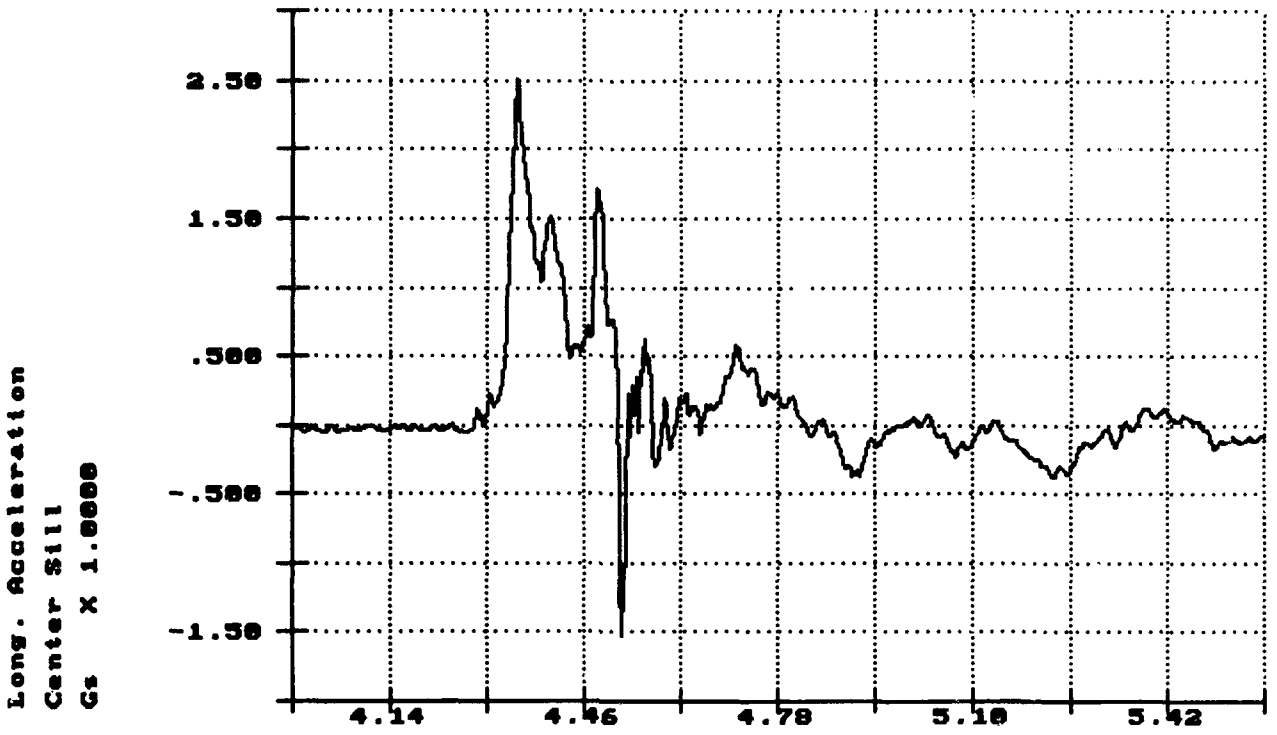
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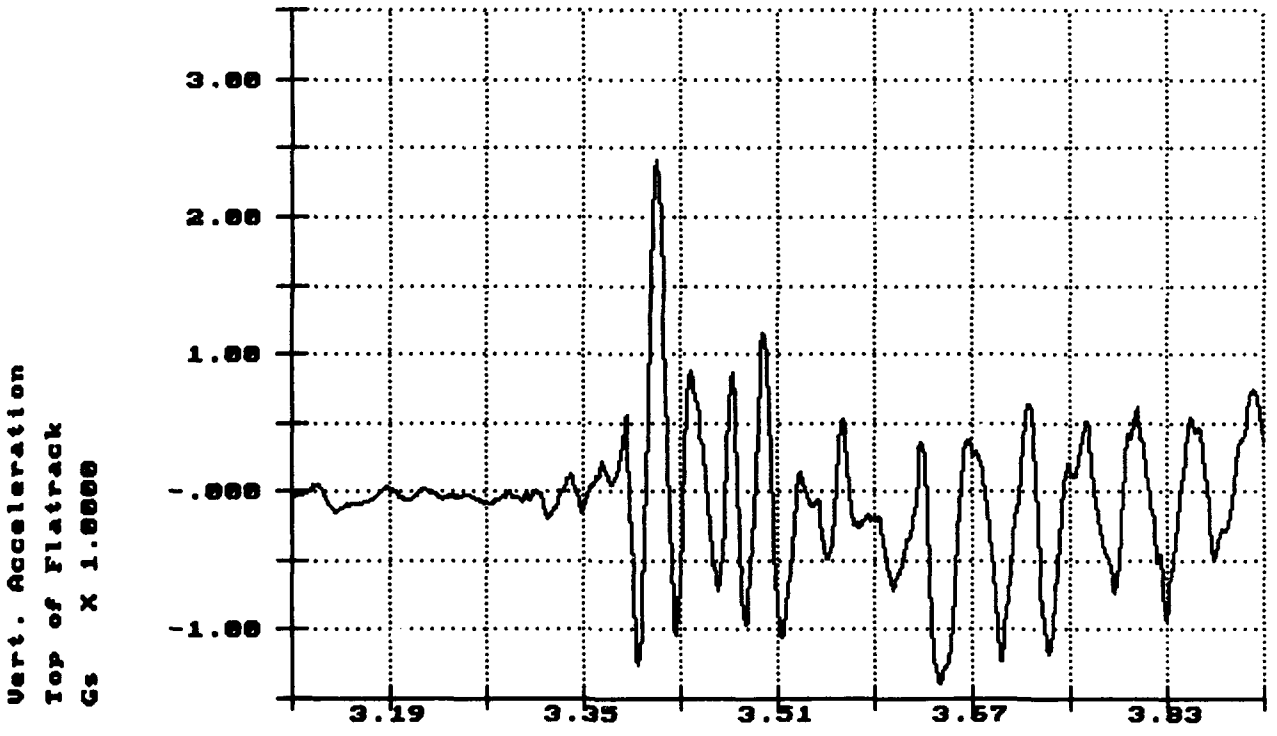
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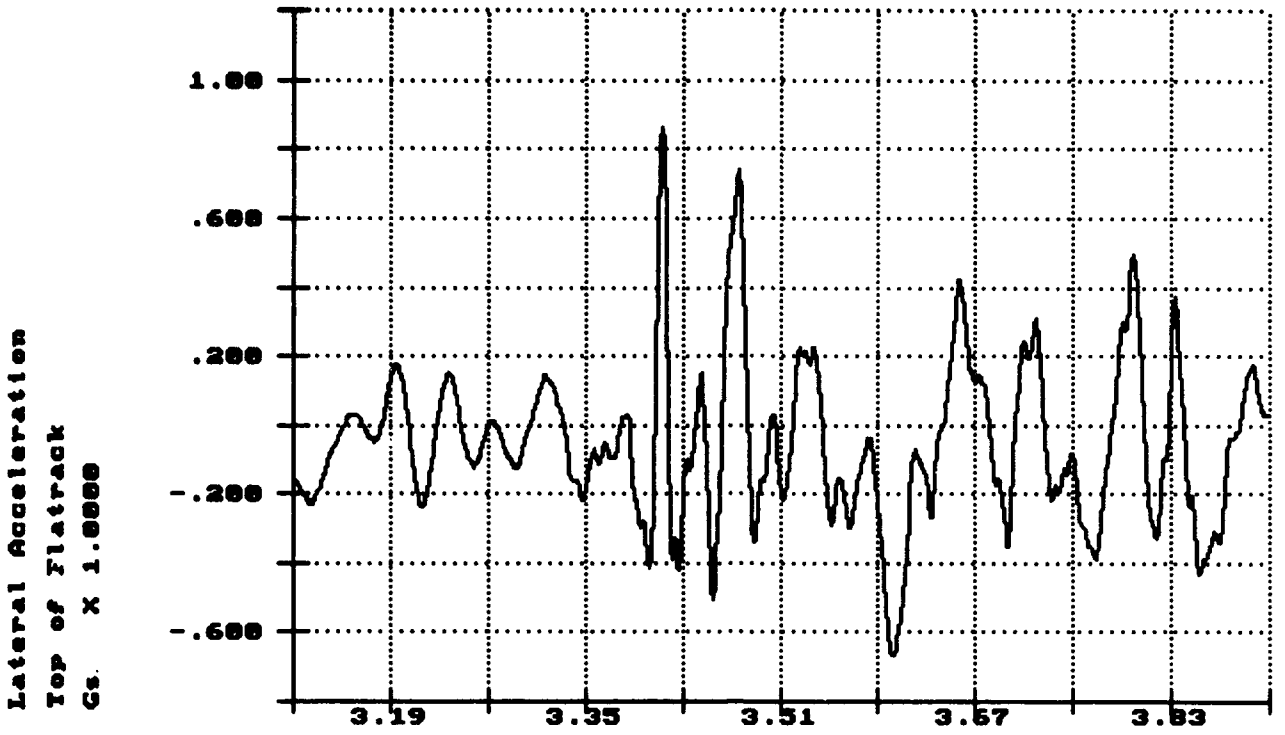
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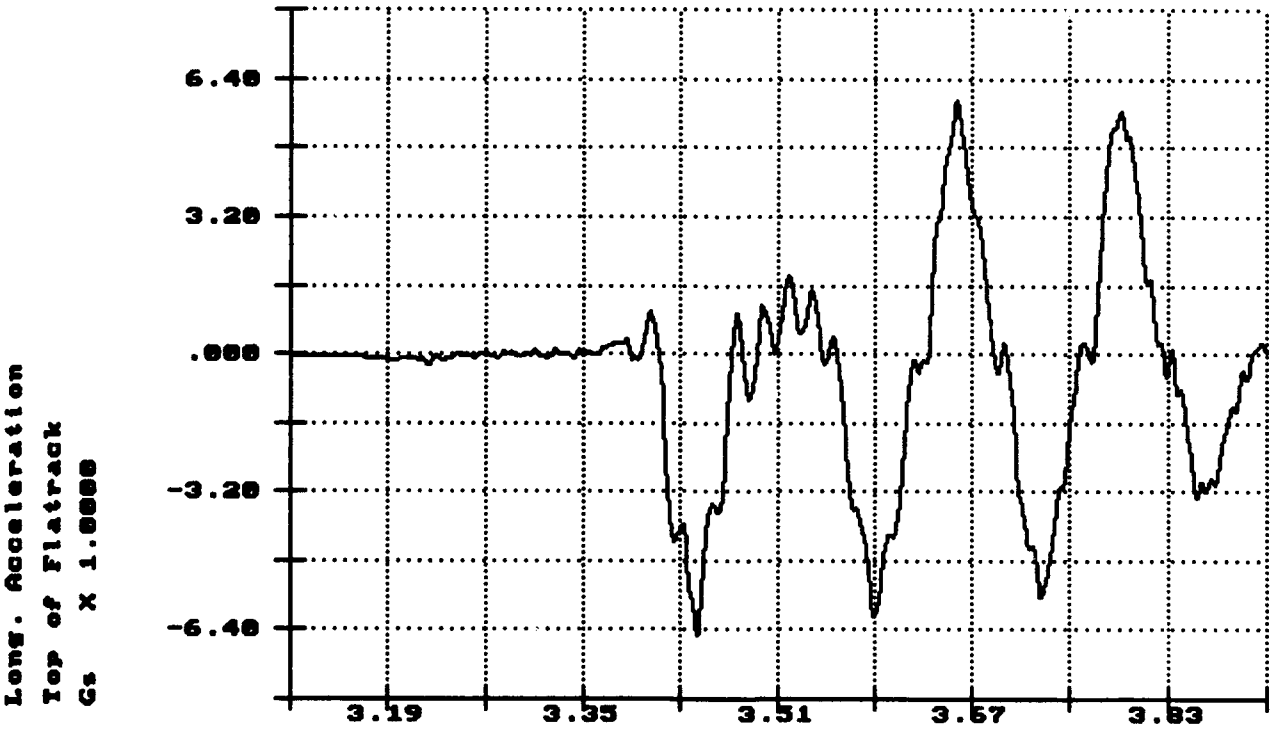
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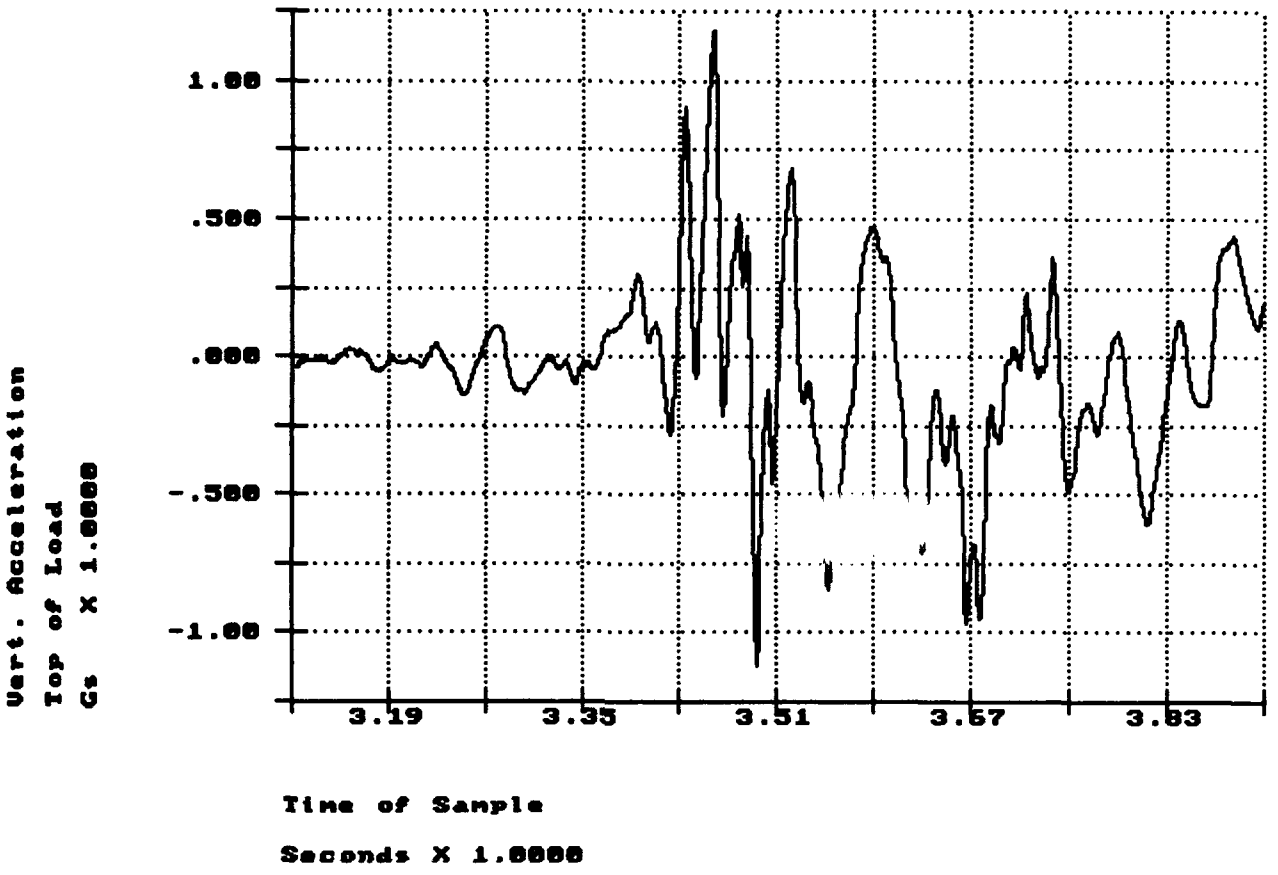
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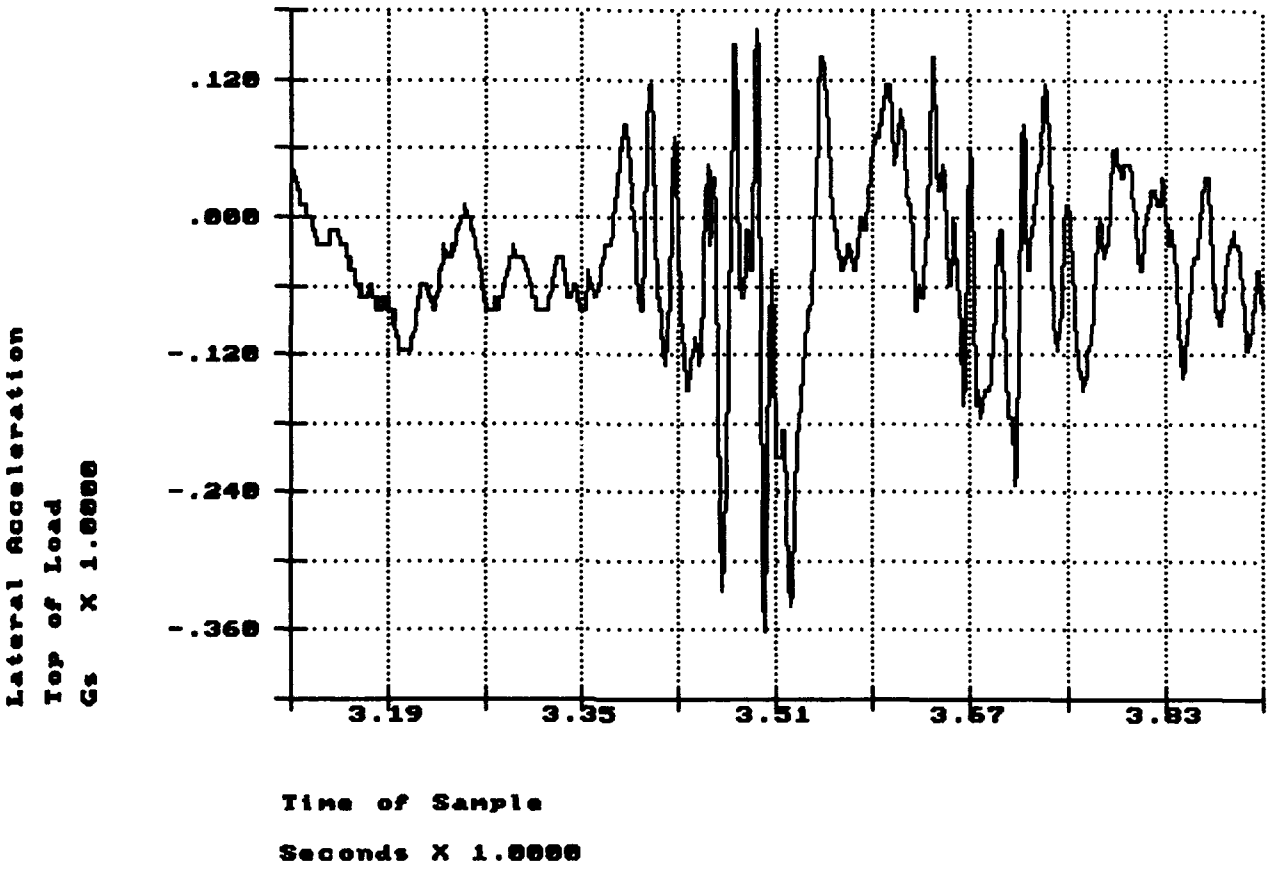
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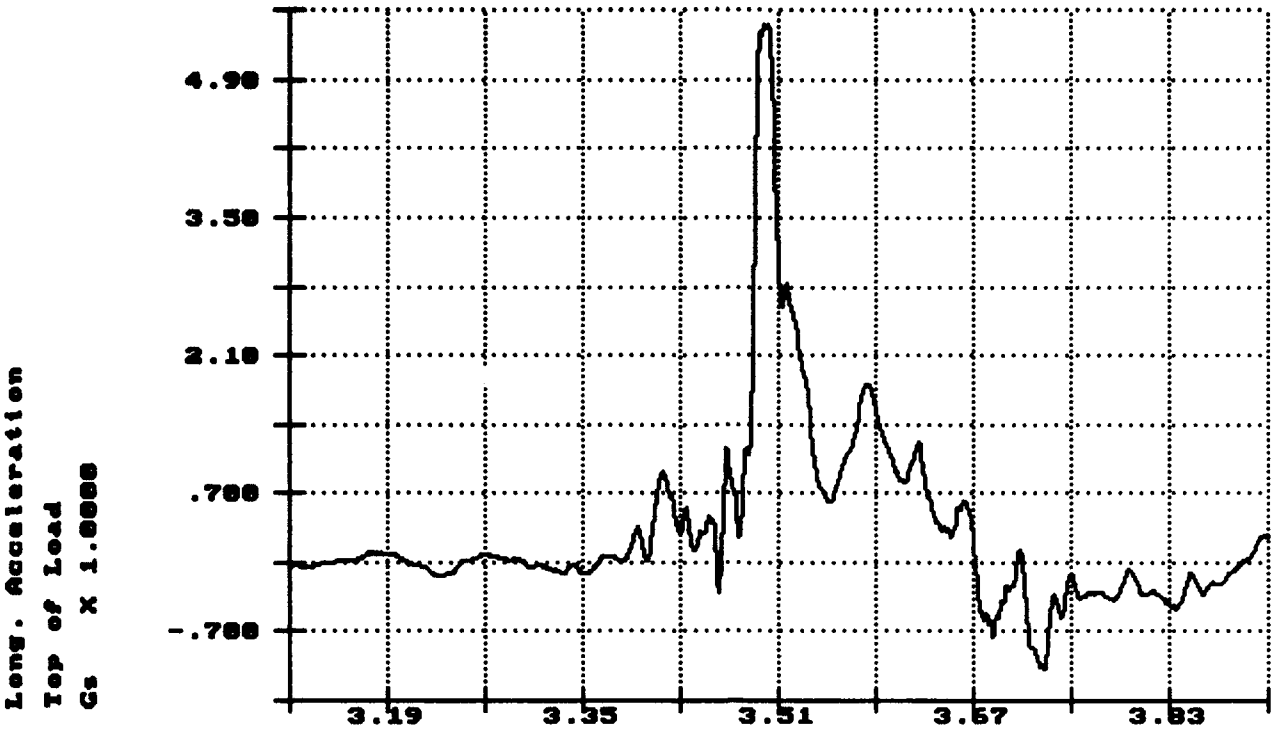
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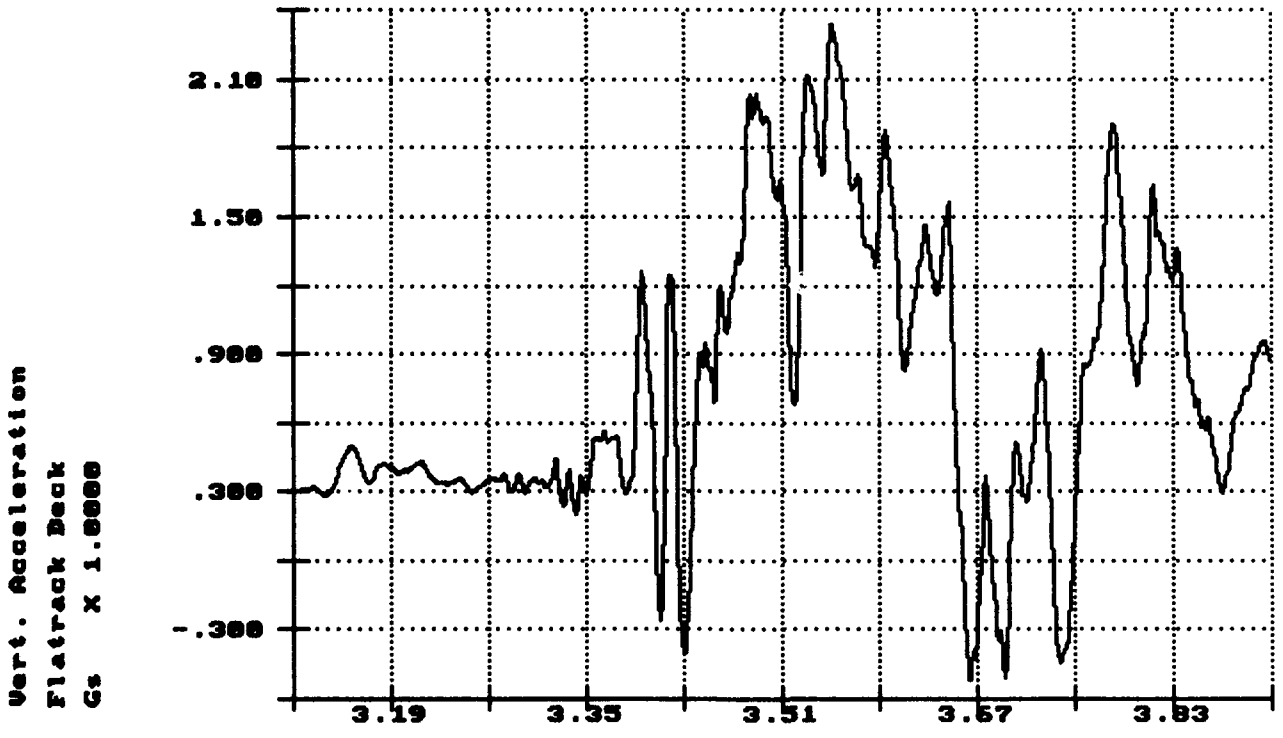
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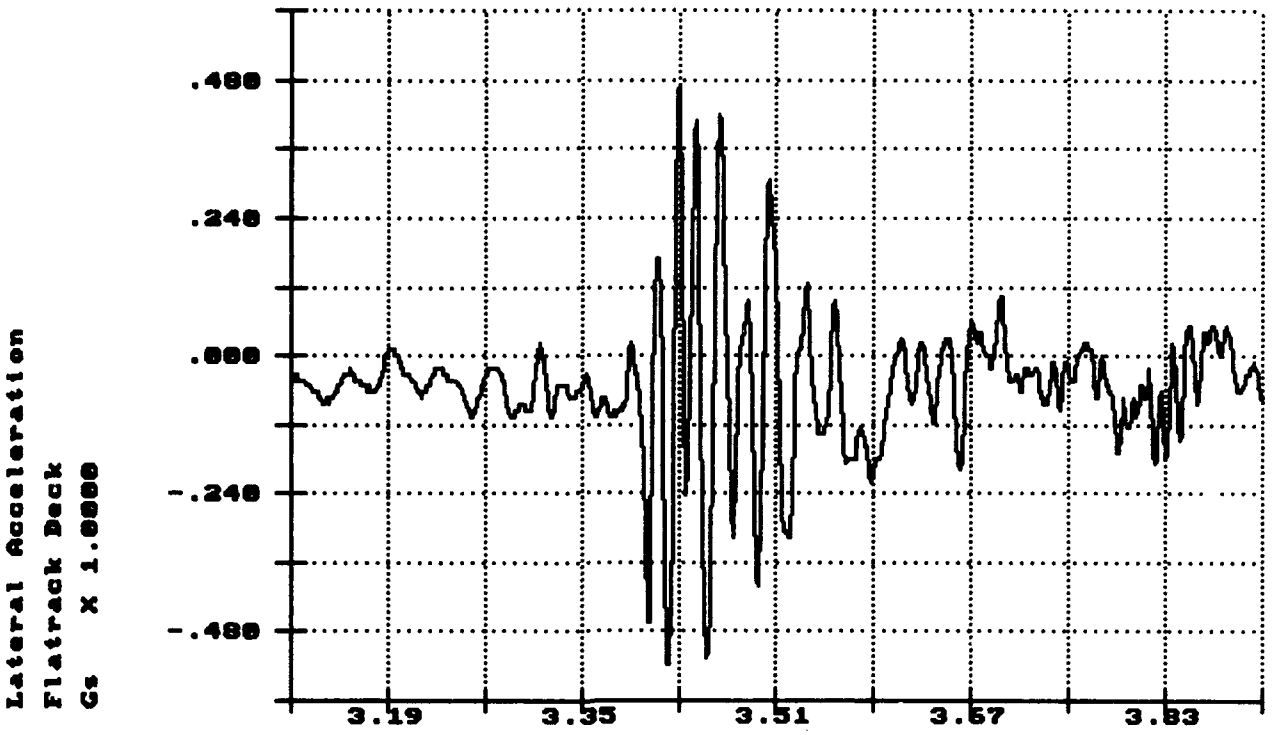
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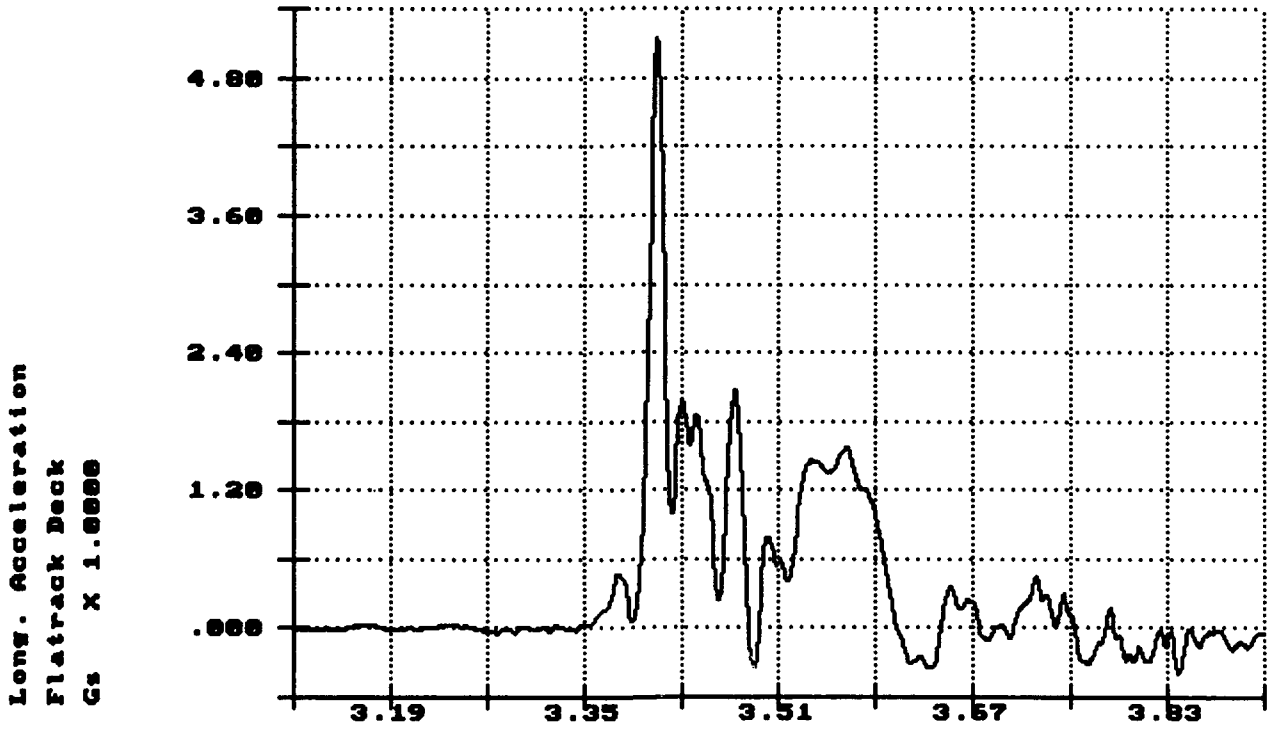
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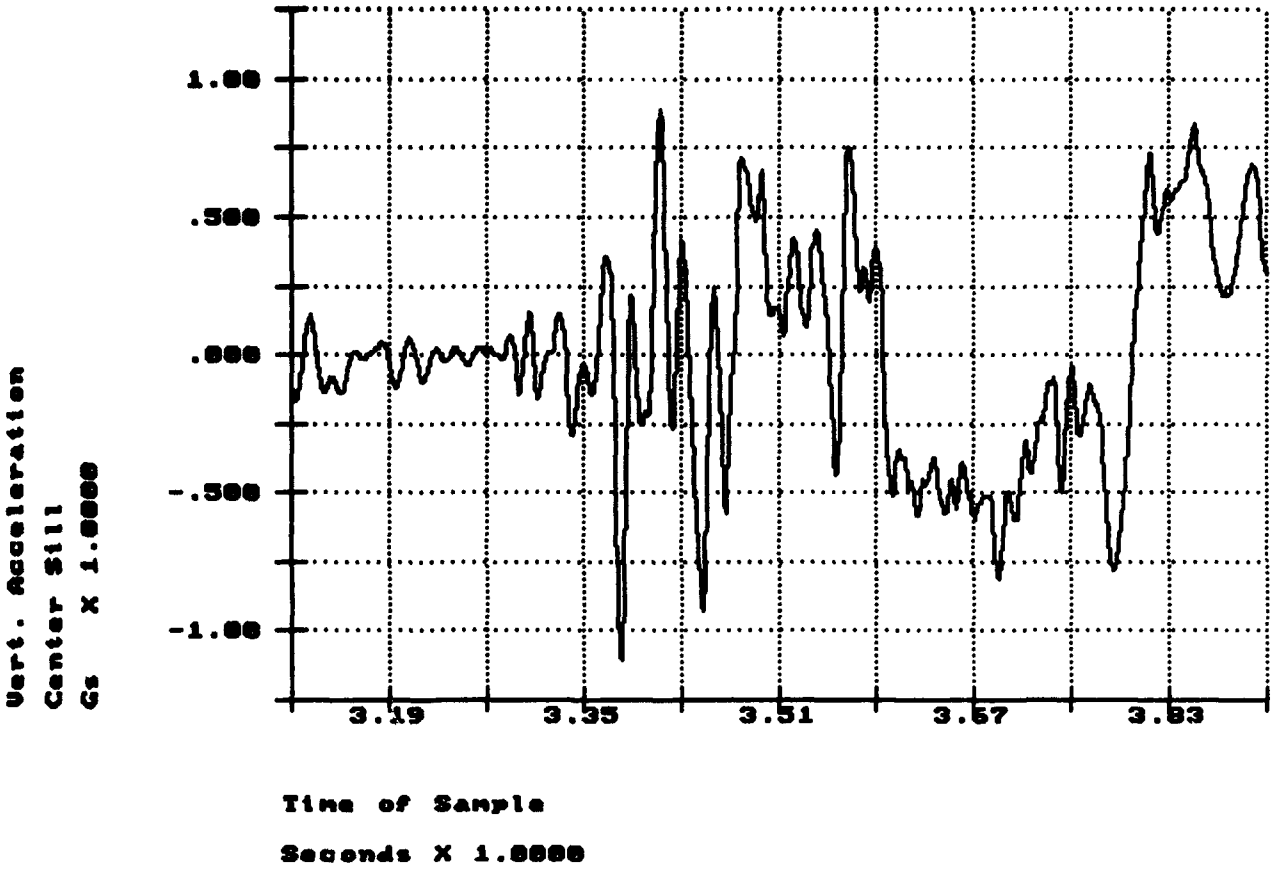
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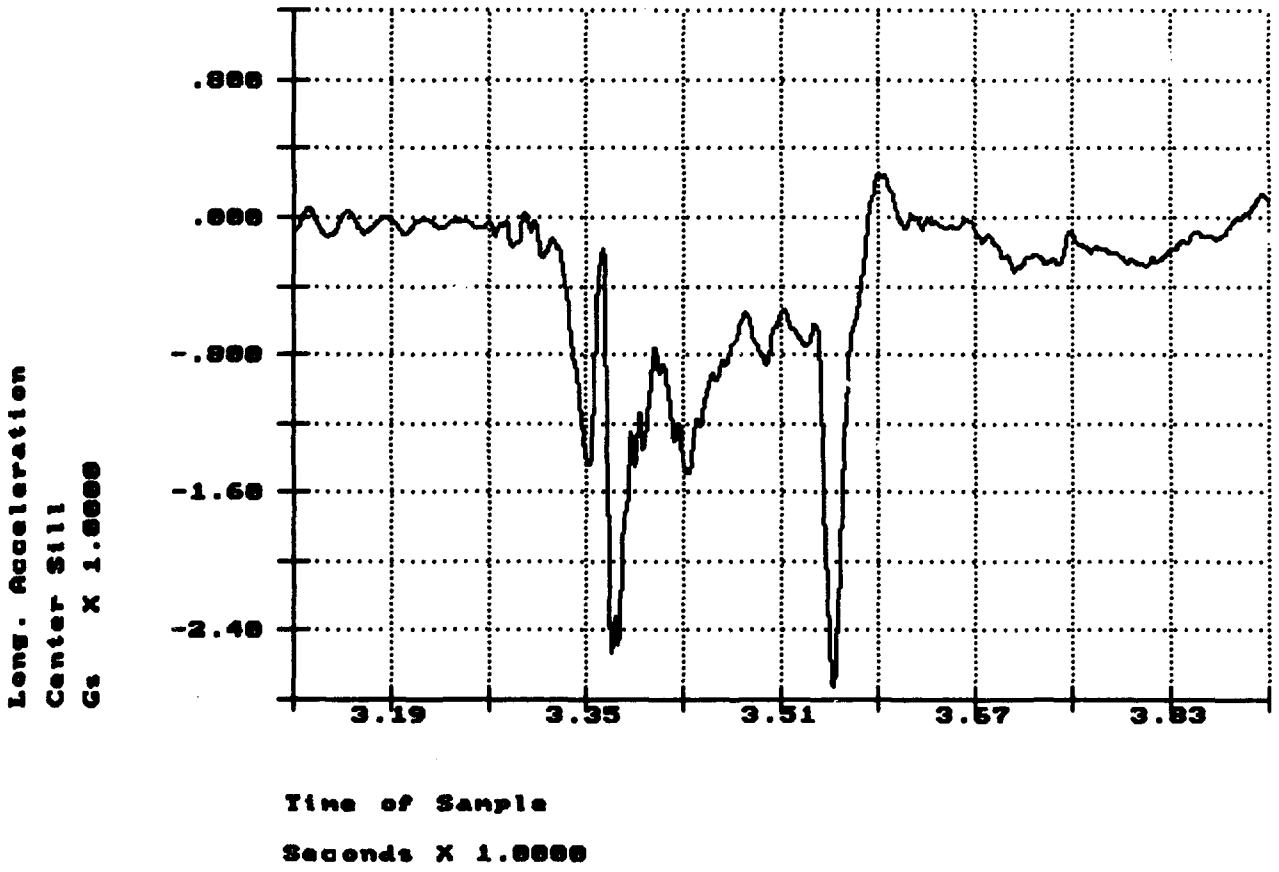
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R.I. of PLS Flatracks, Impact 4: 8.82MPH Nov 16 14:24:34 1993



R.I. of PLS Flatracks, Impact 4: 8.82MPH Nov 16 14:24:34 1993



TEST NO. 3

ROAD TEST DATA

Test No.: 3 Date: 17-18 November 1993

Specimen Load: EPF with 155MM SLPs on a container chassis.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.56 SEC	5.2 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	6.18 SEC	5.3 MPH

REMARKS: No damage to EPF or load movement.

PASS 2-A OVER FIRST SERIES OF TIES:	6.68 SEC	5.1 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	6.55 SEC	5.0 MPH

REMARKS: No damage to EPF or load movement.

30-MILE ROAD TEST: No damage or load movement.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	6.20 SEC	5.5 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	6.18 SEC	5.3 MPH

REMARKS: No damage or load movement.

PASS 4-A OVER FIRST SERIES OF TIES:	6.56 SEC	5.2 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	6.06 SEC	5.4 MPH

REMARKS: No damage or load movement.

WASHBOARD COURSE: No observed damage or load movement.

SHIPBOARD TRANSPORTATION SIMULATOR: No damage or load movement.

TEST NO. 4

ROAD TEST DATA

Test No.: 4 Date: 17-22 November 1993

Specimen Load: EPF with 120MM PA116 metal pallets on a container chassis.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.32 SEC	5.14 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	6.21 SEC	5.27 MPH

REMARKS: Metal pallet skids deformed when contact was made with the raised EPF side rails.

PASS 2-A OVER FIRST SERIES OF TIES:	6.15 SEC	5.54 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	5.82 SEC	5.62 MPH

REMARKS: Metal pallet skids deformed when contact was made with the raised EPF side rails.

30-MILE ROAD TEST: No additional damage.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	6.33 SEC	5.38 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	6.03 SEC	5.43 MPH

REMARKS: Continuing deformation of pallet skids.

PASS 4-A OVER FIRST SERIES OF TIES:	5.97 SEC	5.71 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	5.15 SEC	6.35 MPH

REMARKS: Continuing deformation of pallet skids.

WASHBOARD COURSE: Drive-on end wall ramp locking pins became disengaged.

SHIPBOARD TRANSPORTATION SIMULATOR: No additional damage or loose pins.

DETAILS OF FAILURE

During road hazard course testing, the EPF loaded with 120MM tank ammunition metal pallets caused deformation of the pallet skids. The pallets are 40 by 44 inches and loaded laterally along the 44-inch side. This loading configuration allows a maximum payload of 10 pallets on the EPF. If the pallets were oriented with their 40-inch dimension in the lateral direction, only 8 pallets could be configured on the EPF floor area.

The outer end of the pallet skids rested on the EPF rail. The inner end of the pallet skid sloped slightly downward making contact at the centerline of the EPF deck. The 120MM tank ammunition pallet skids were approximately 1/2-inch above the EPF deck at the outer rail with minimal or no support until the other end of the skid touched the deck at the center of the EPF. After traversing the road hazard course, the pallet skids were in complete contact with the recessed deck from the center of the EPF to the outer rail. As a result of the deformation of the pallet skids, the load loosened to a point where the securement would yield in the transportation environment and possibly damage the load.

Since there are many ammunition loads that are unitized on 44-inch to 48-inch width pallets, the deck should uniformly support the cargo loaded onto it. Loads that stretch from rail-to-rail will actually bridge the recessed deck so that the outside rails will carry most of the load. For this reason, it is desirable to have the EPF deck at the same elevation as the side rails. The recessed deck is unacceptable for transporting ammunition.

At the conclusion of road transportation testing it was observed that the ramp locking/hinge pins on the right side of the rack had become disengaged. Both ratchet assemblies slid toward the center of the of the EPF. It appeared that the locking assembly became disengaged during the transportation cycle which allowed the pin assemblies to retract.

TEST NO. 5

RAIL IMPACT DATA

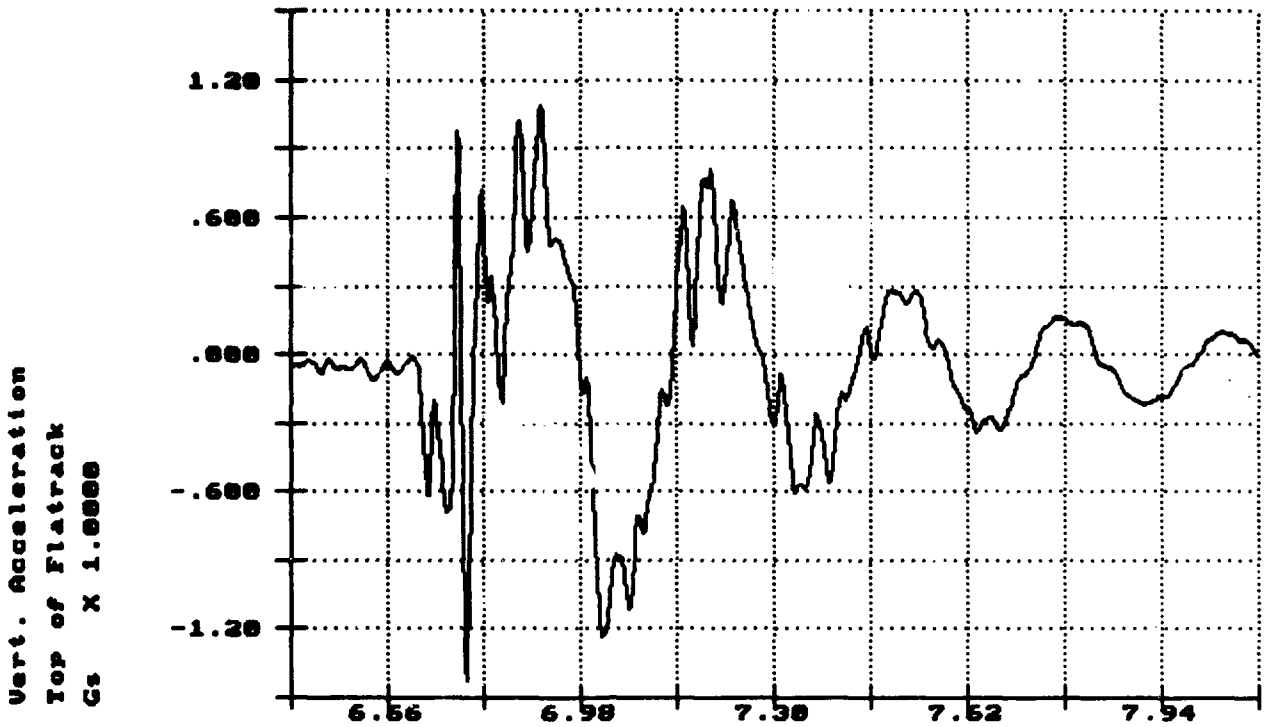
Test No.: 5 Date: 23 November 1993

Specimen Load: PLS trailer with an EPF loaded with 155MM SLPs.

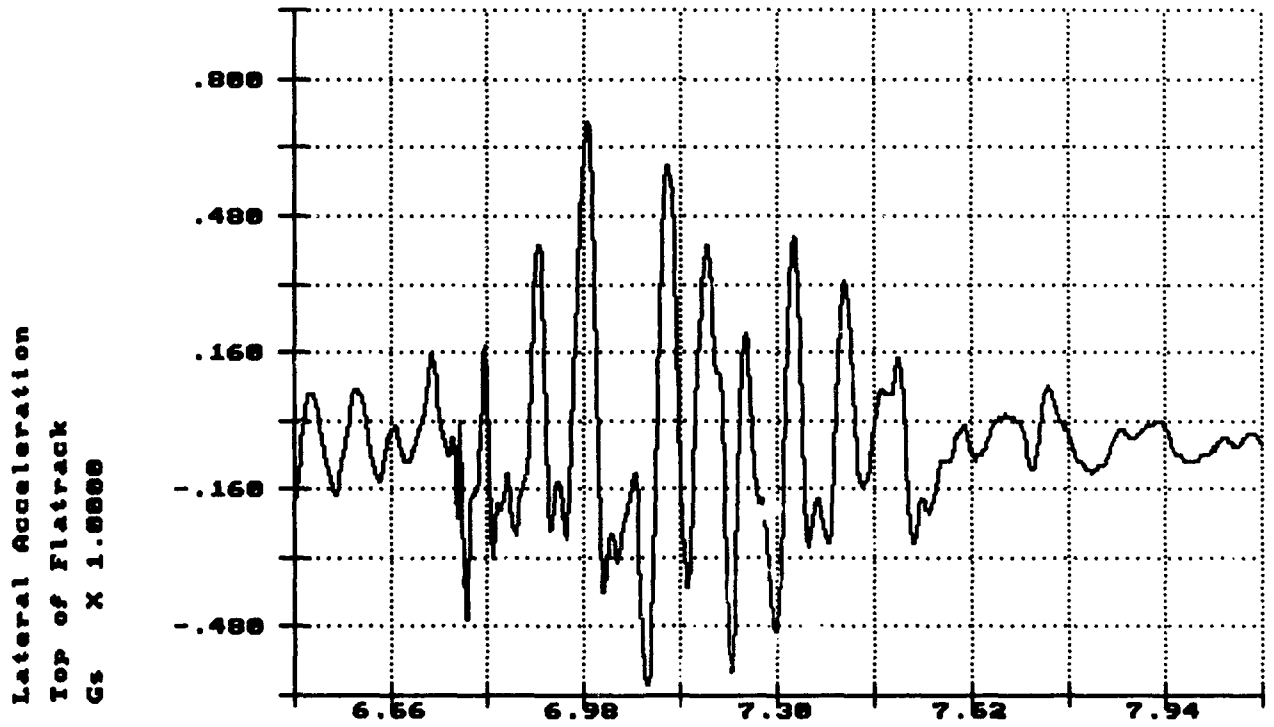
Flatcar No.: EJ&E 6099	Lt. Wt.: 56,200
PLS Trailer	Wt.: 13,240
EPF No. 1	Wt.: 7,500
Lading, 155MM SLPs	Wt.: 28,000
	Total Specimen Wt.: 104,940
	Buffer Car (five cars) Wt: 250,000

Impact	End Struck	Velocity	Remarks
1	Forward	3.91	1-inch gap at rear of EPF.
2	Forward	4.81	EPF rollers 1/2-inch from stops.
3	Forward	6.83	No change in load or rollers. Locking pin immovable - wedged diagonally.
4	Forward	8.62	Load shifted back 1/2-inch. Spacing equal at each end of load.
5	Rear	8.42	Front trailer wheels 2 inches from chocks. One cable loose. 1-inch gap at rear of EPF.

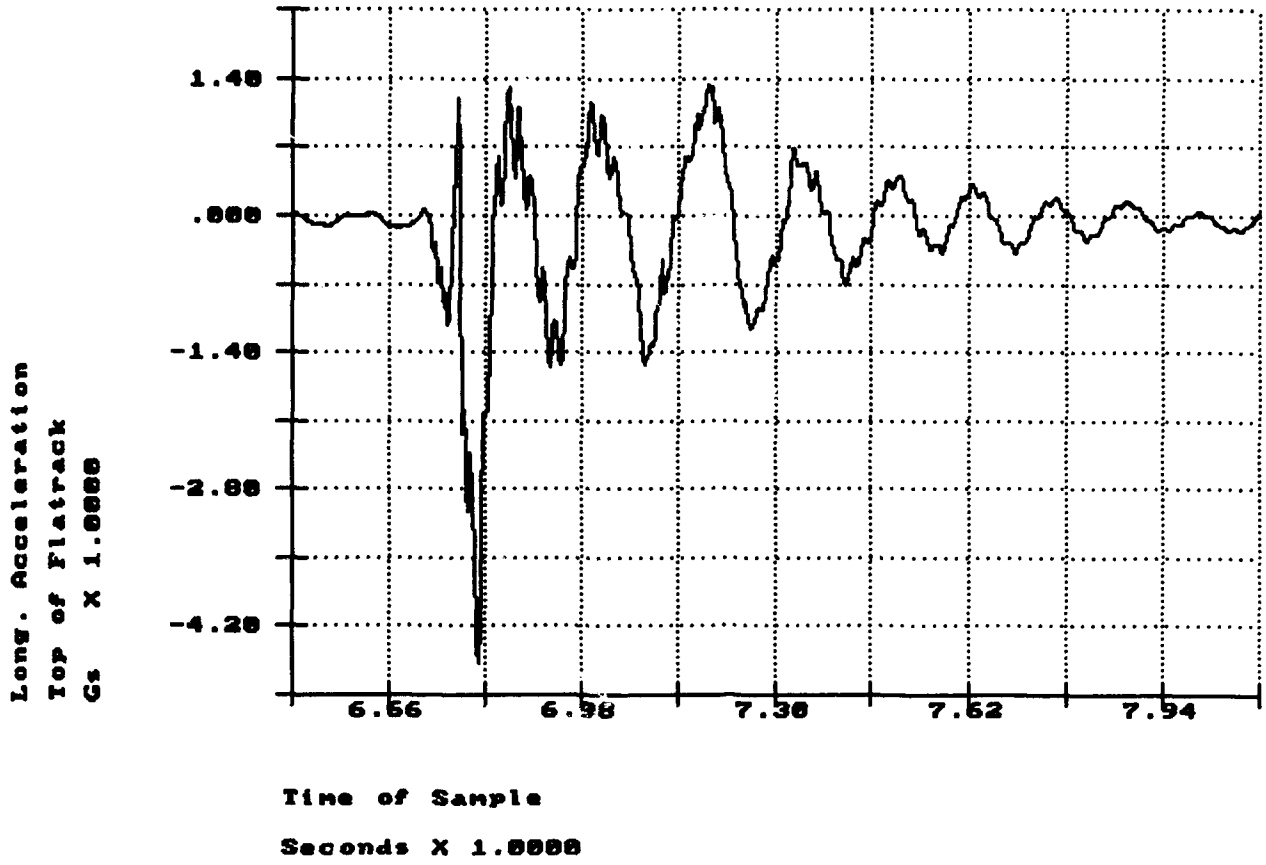
R.I. of PLS Flatrack, Impact 1: 3.91MPH Nov 23 09:29:49 1993



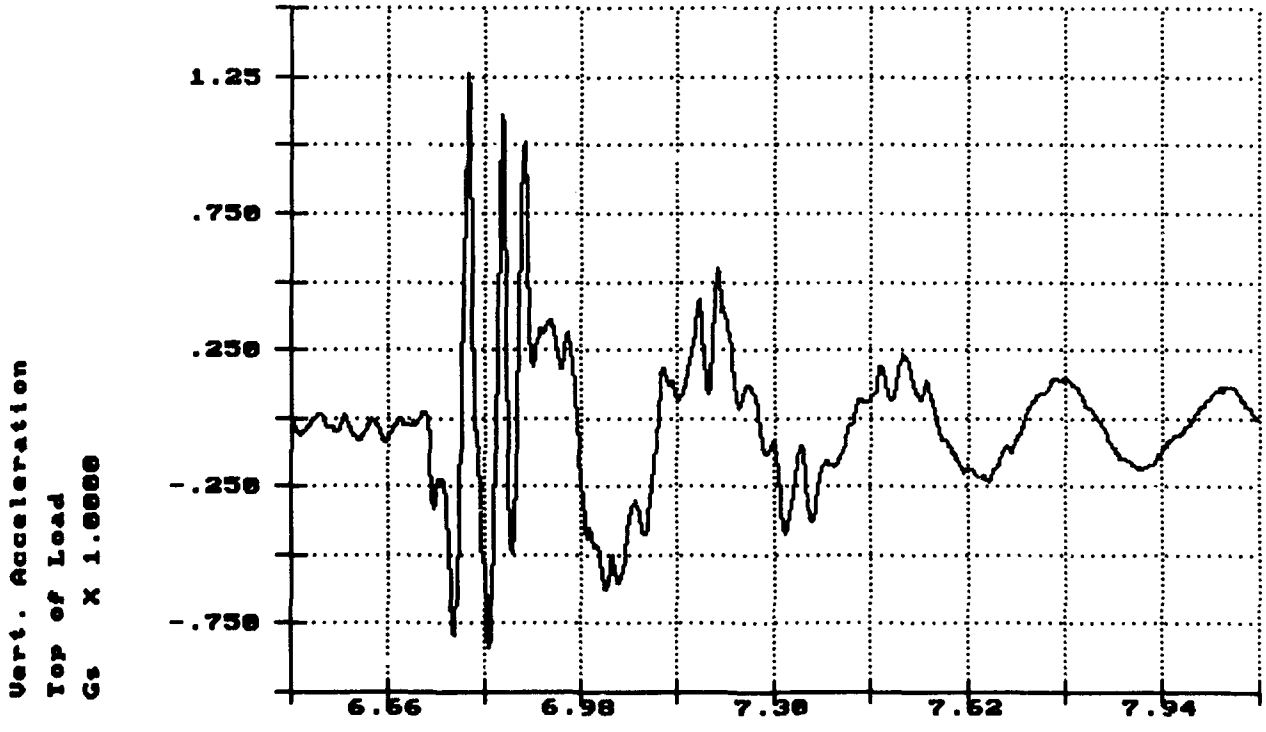
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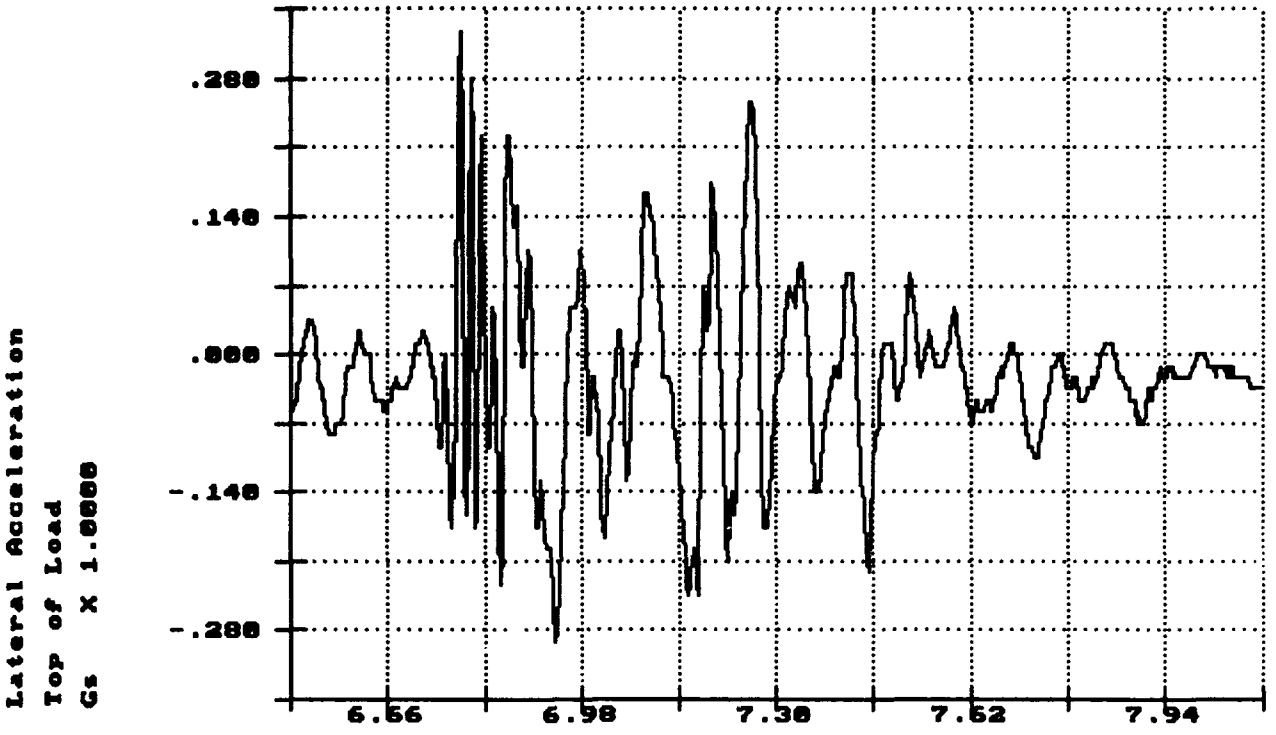
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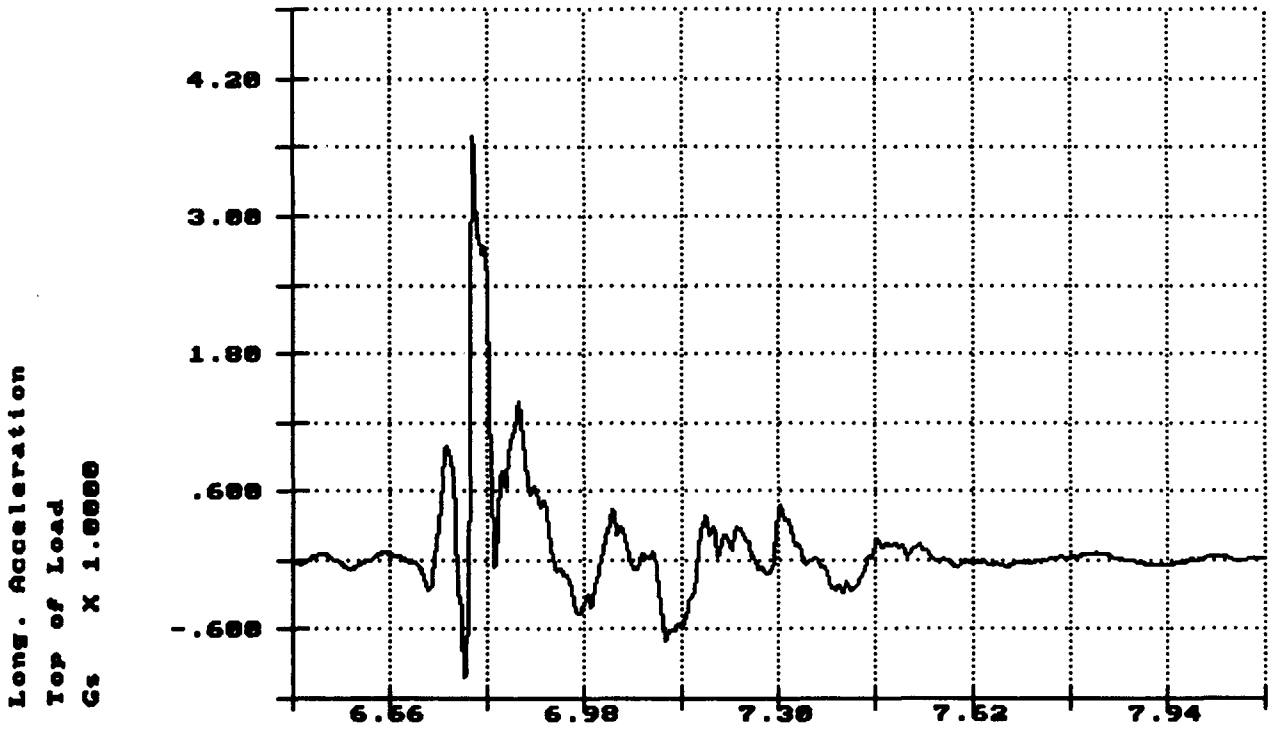
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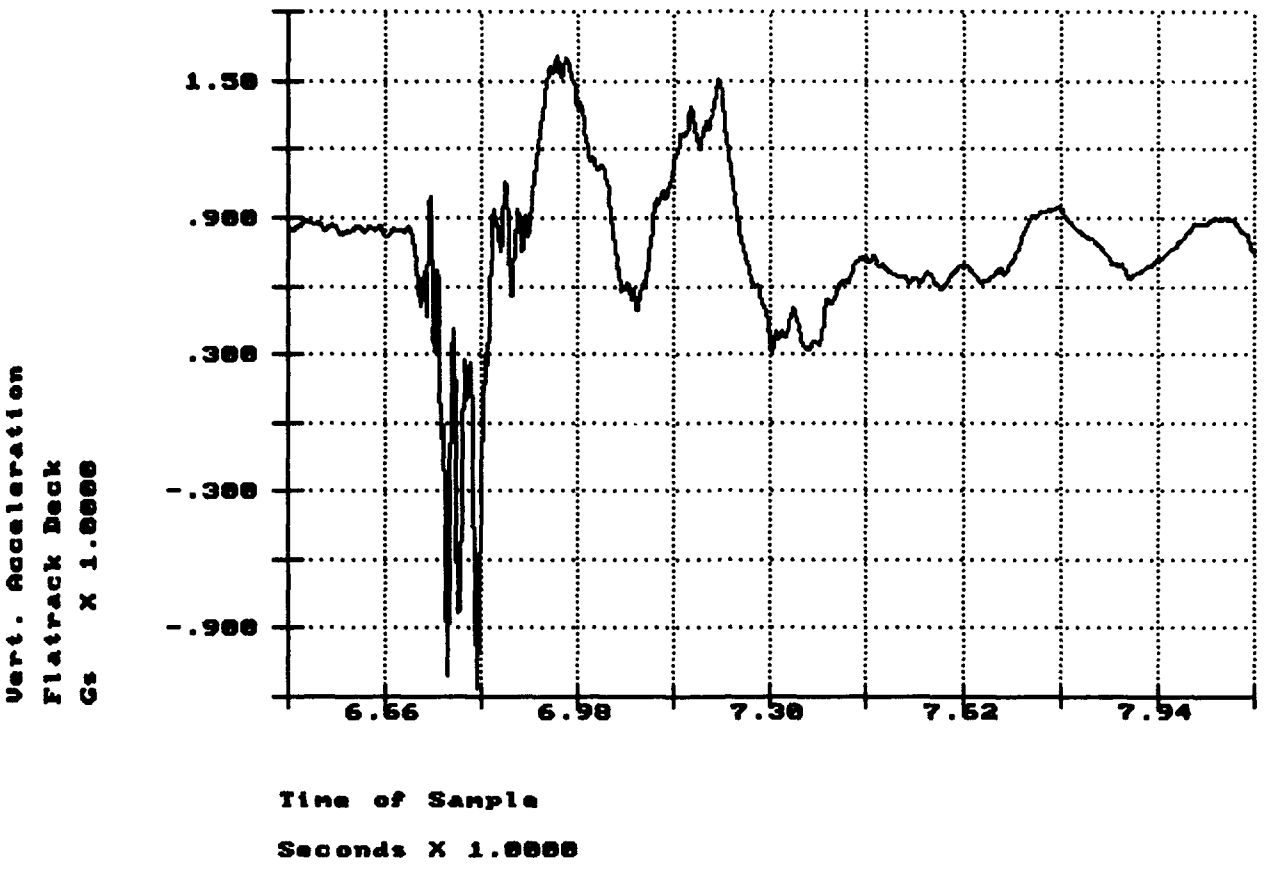
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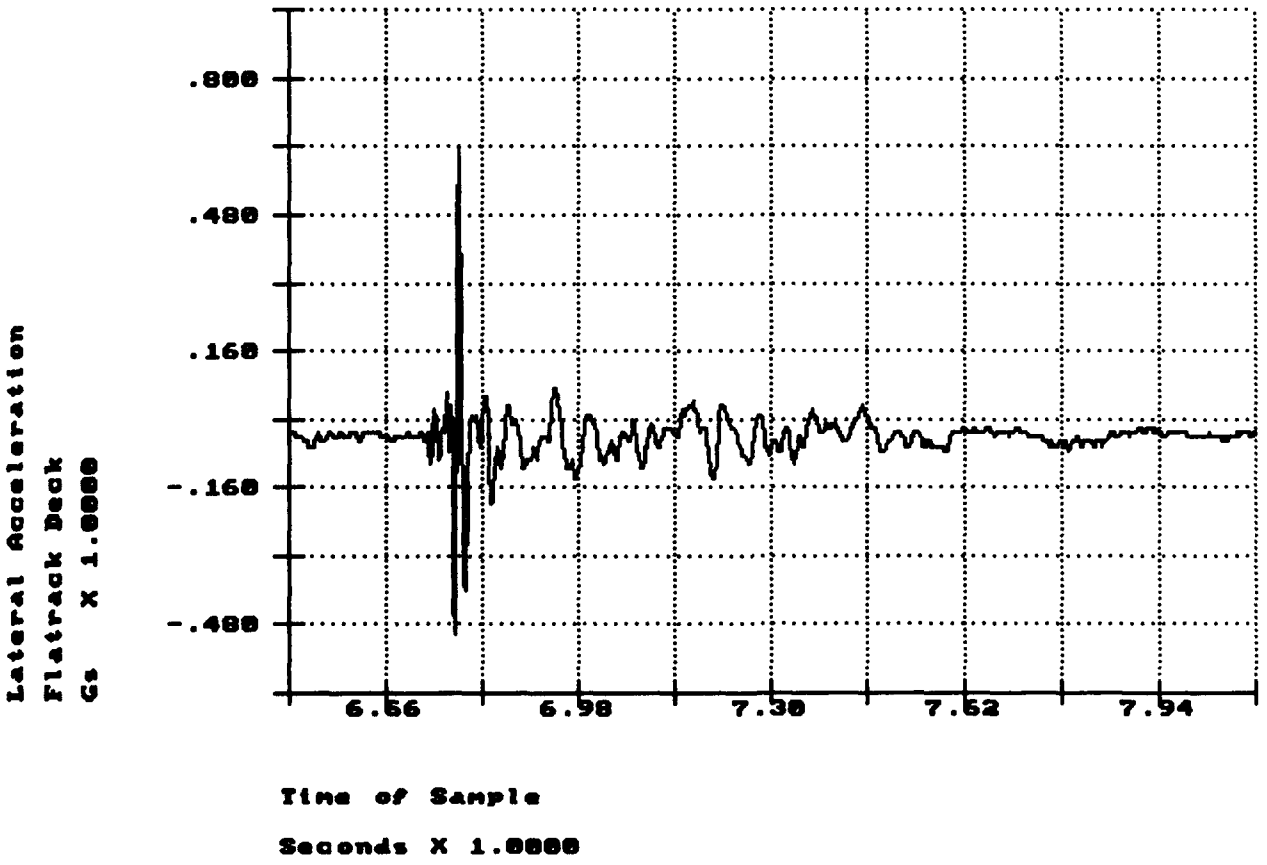
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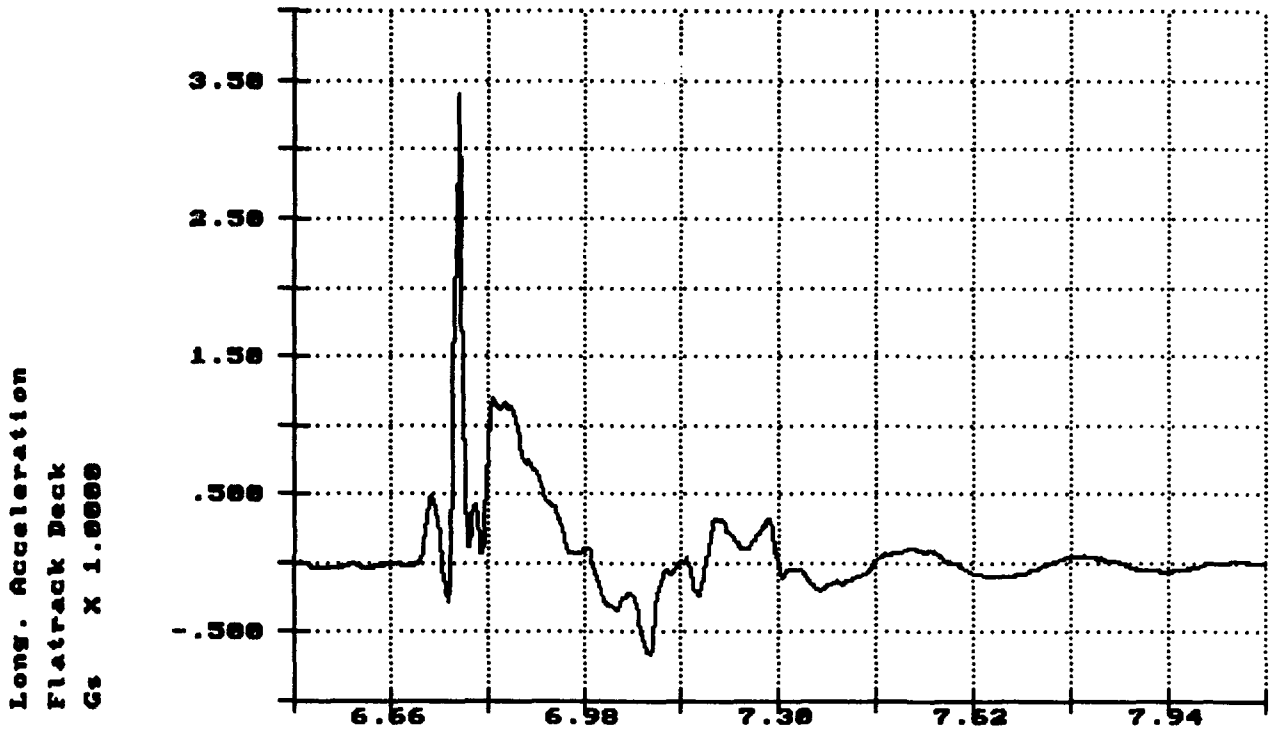
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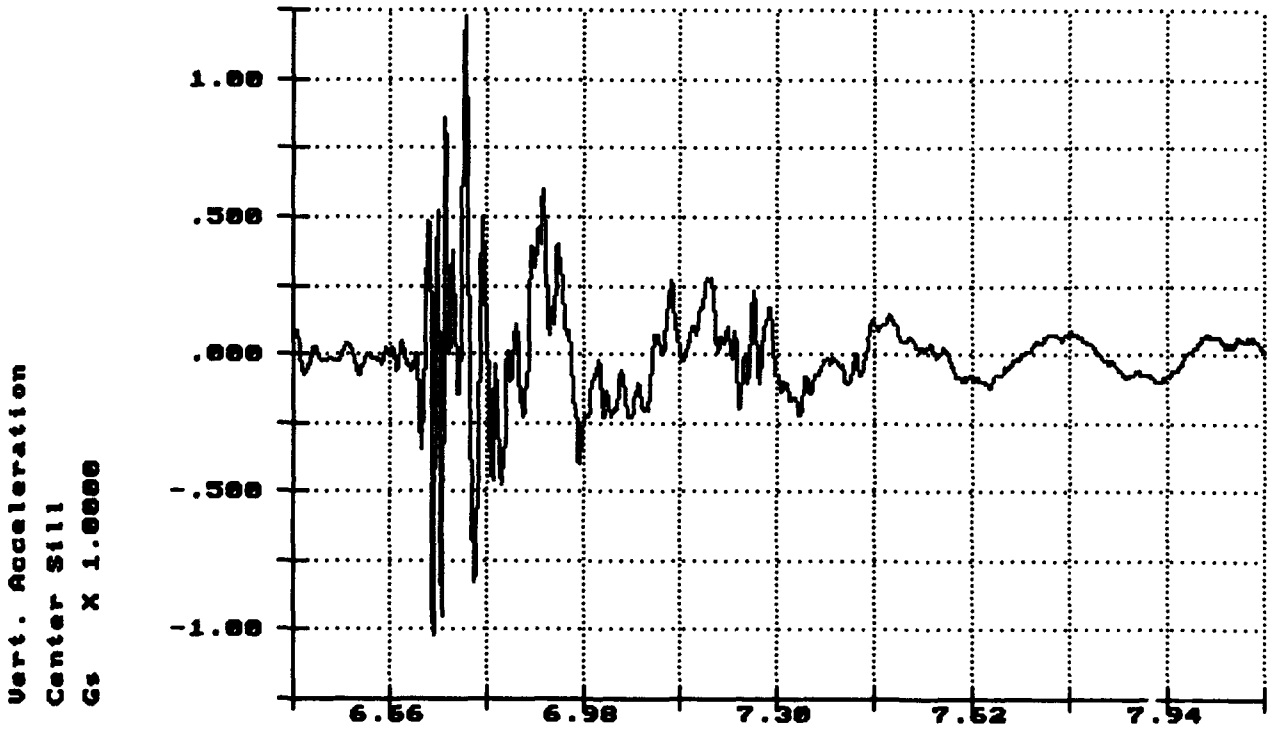
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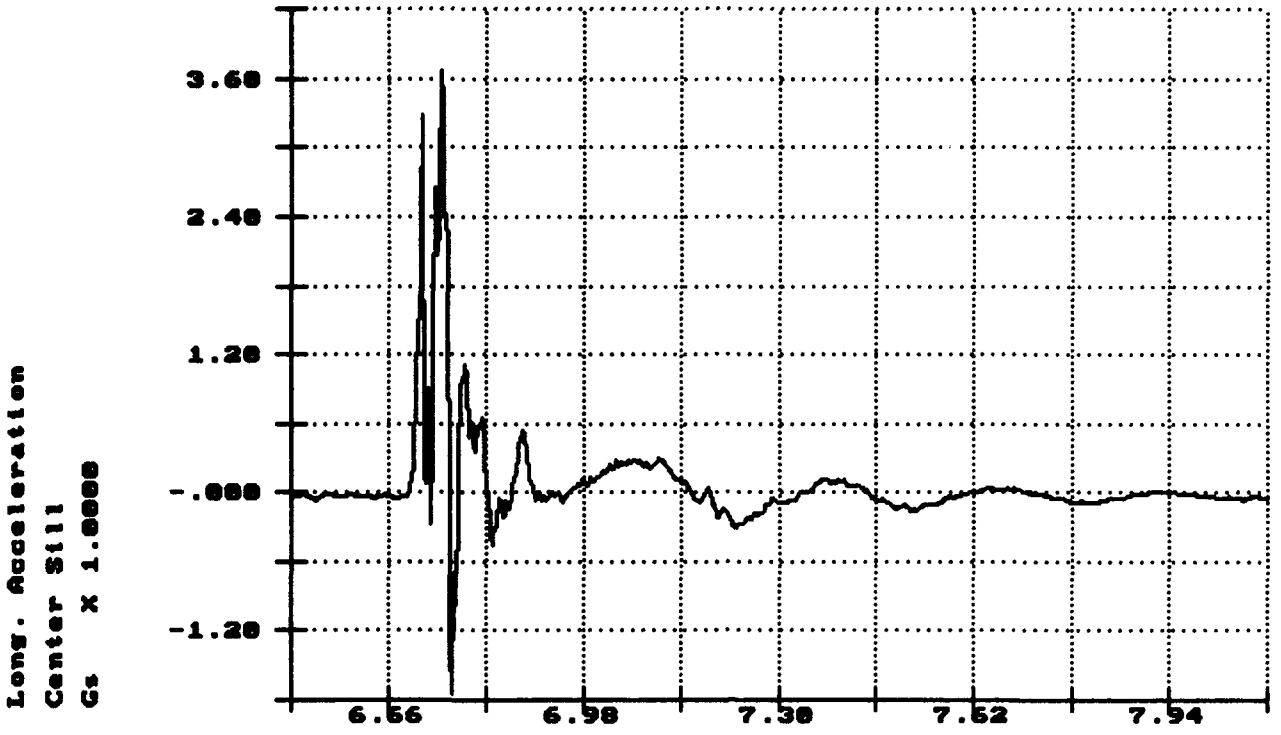
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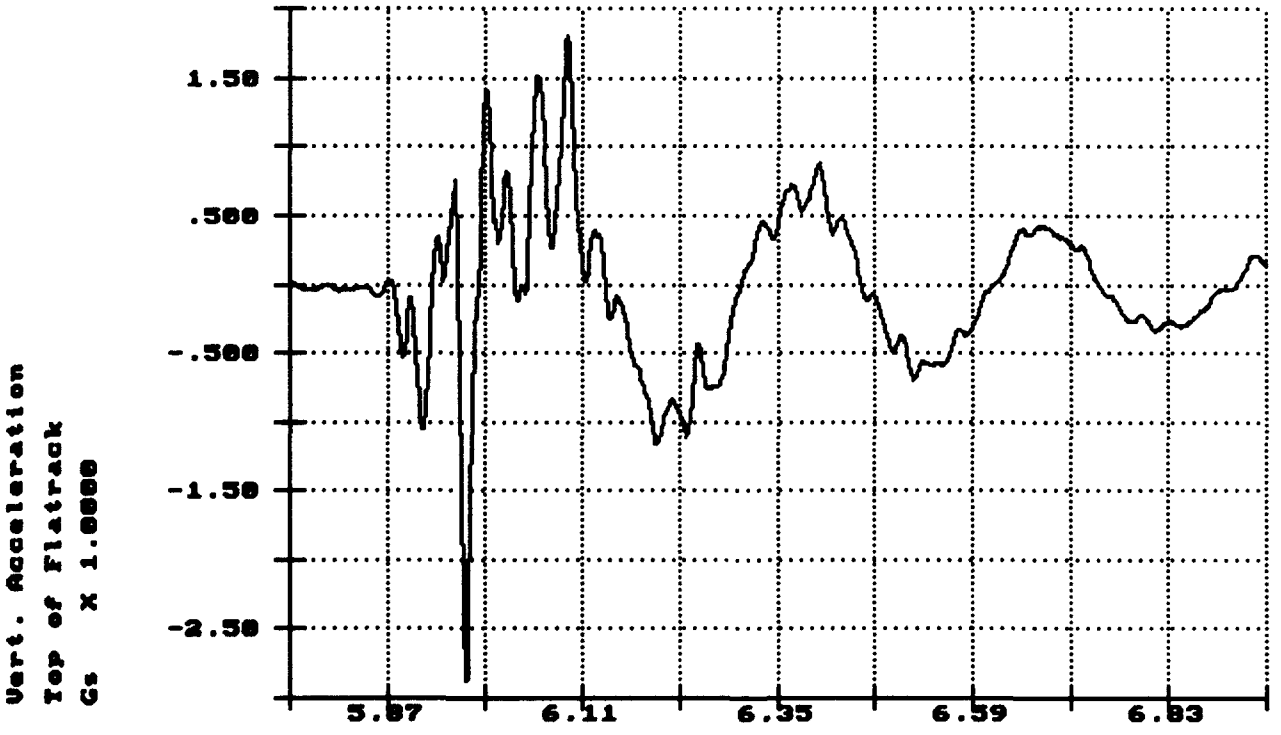
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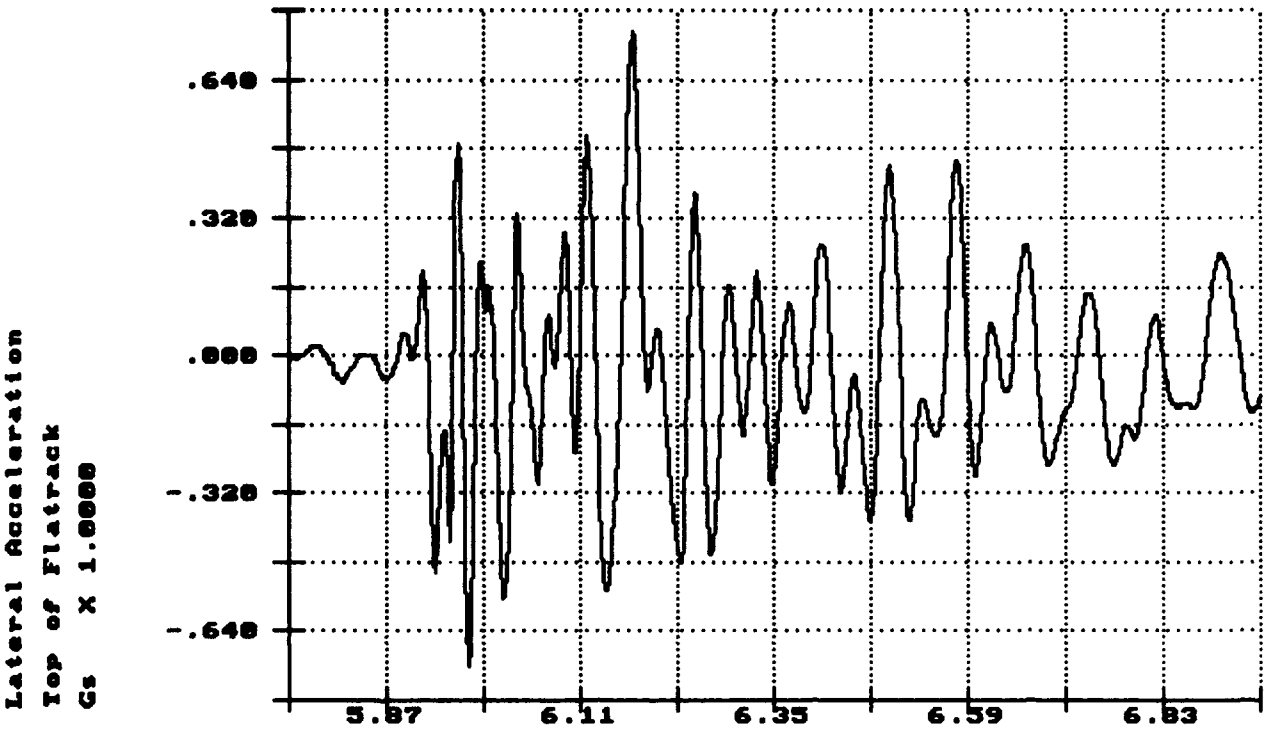
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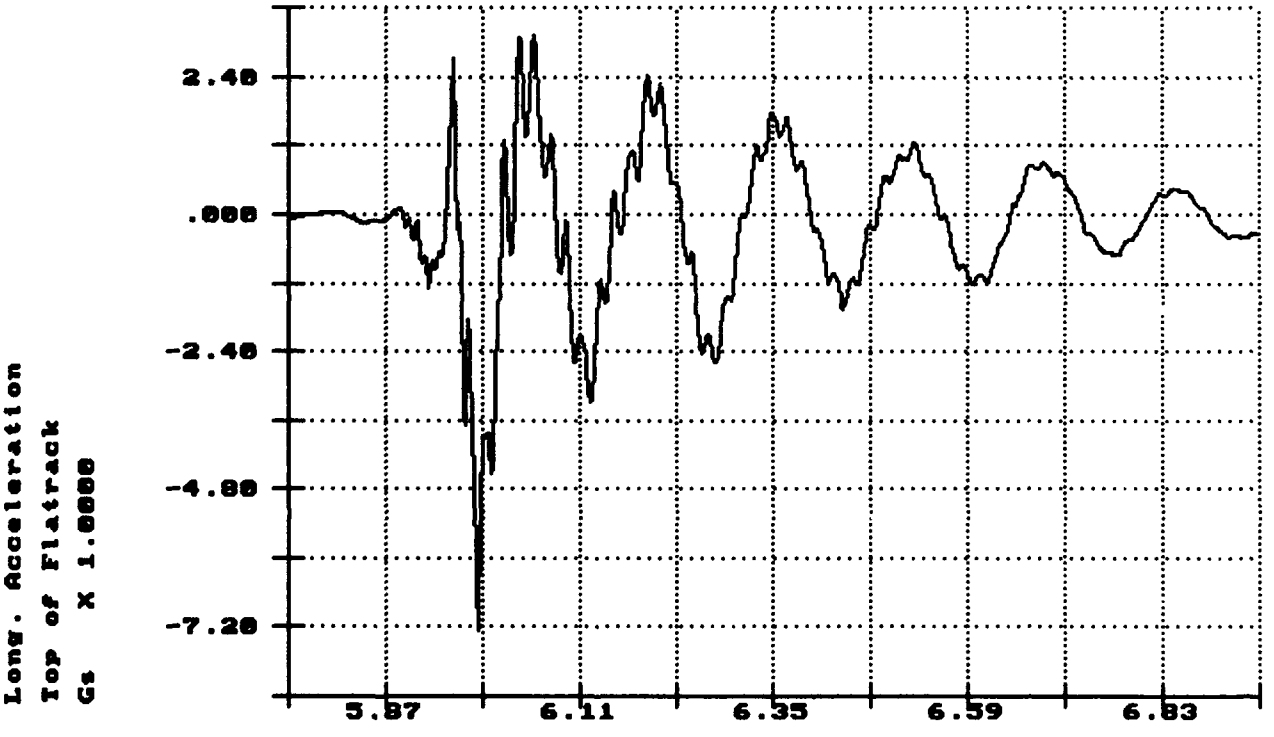
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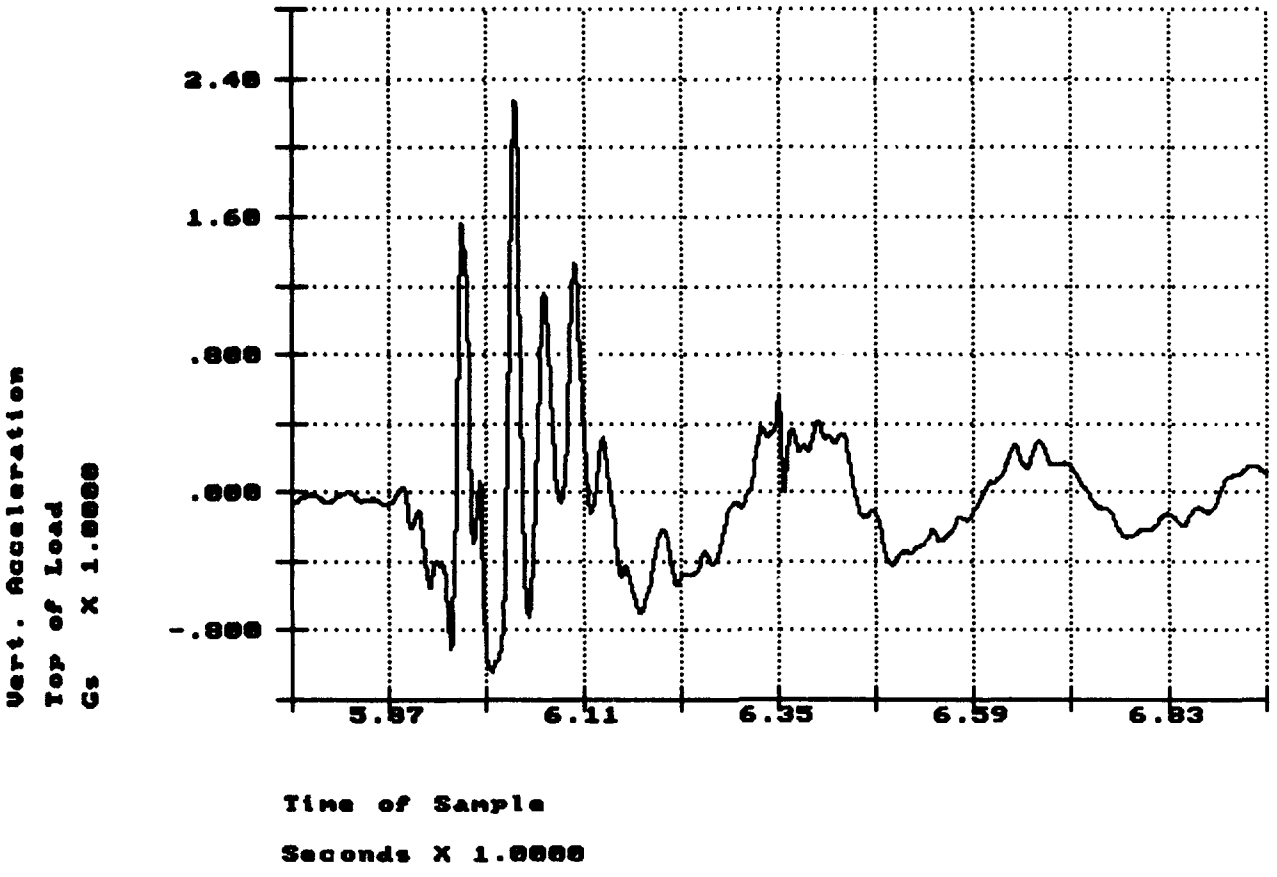
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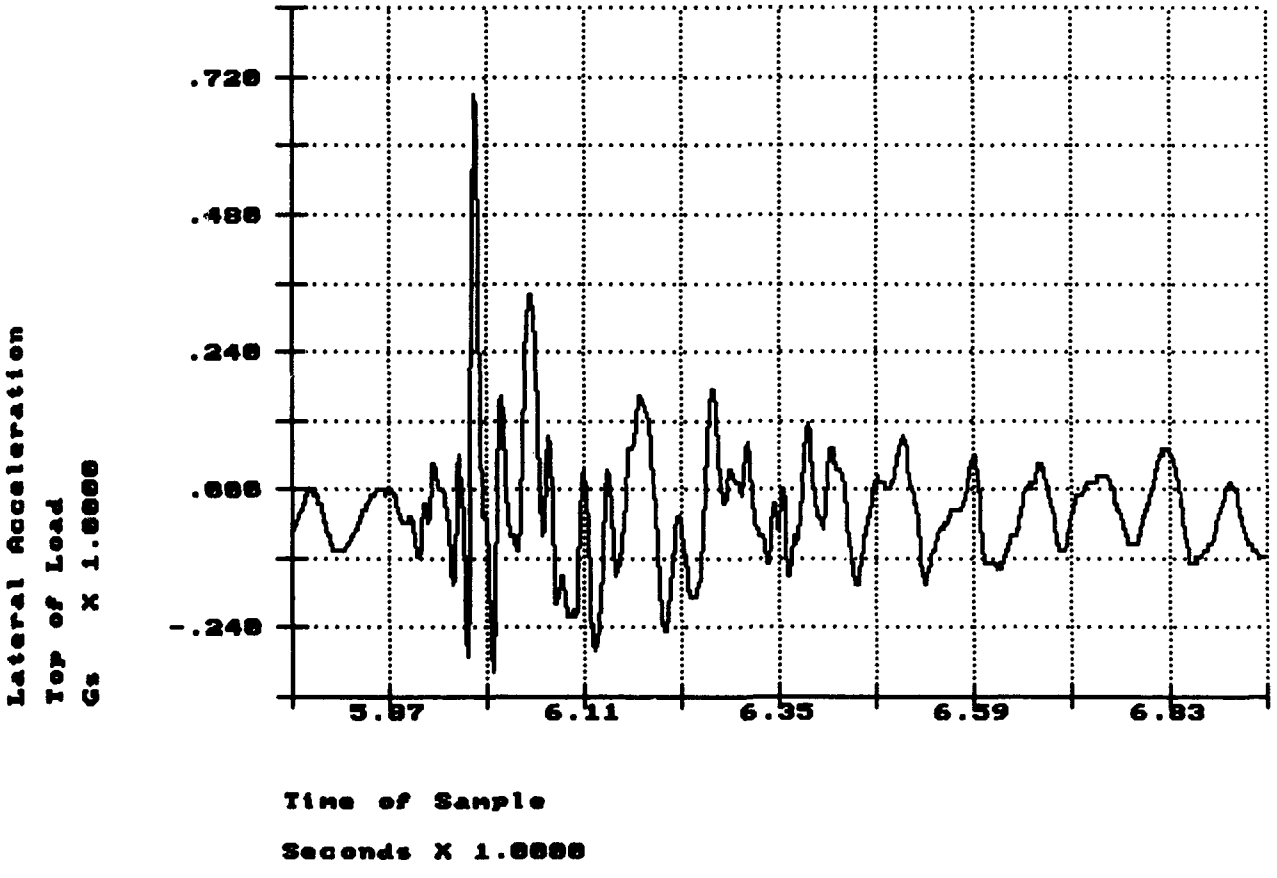
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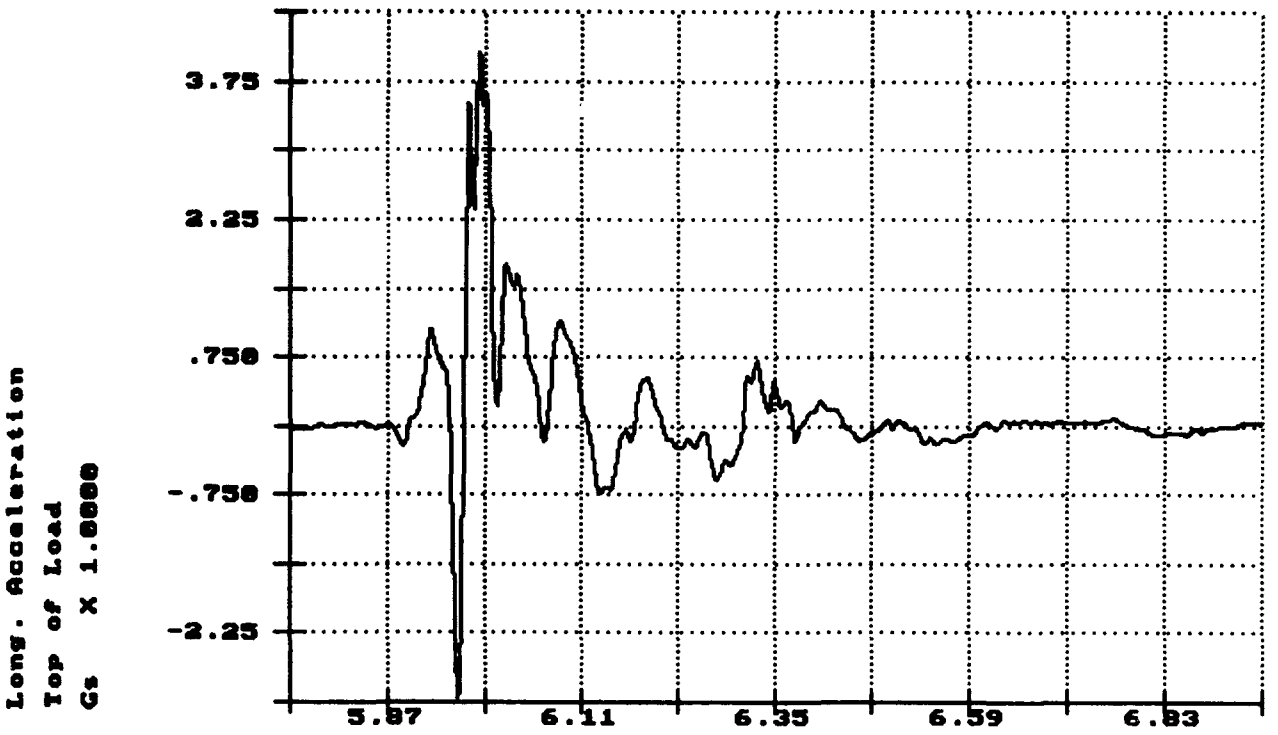
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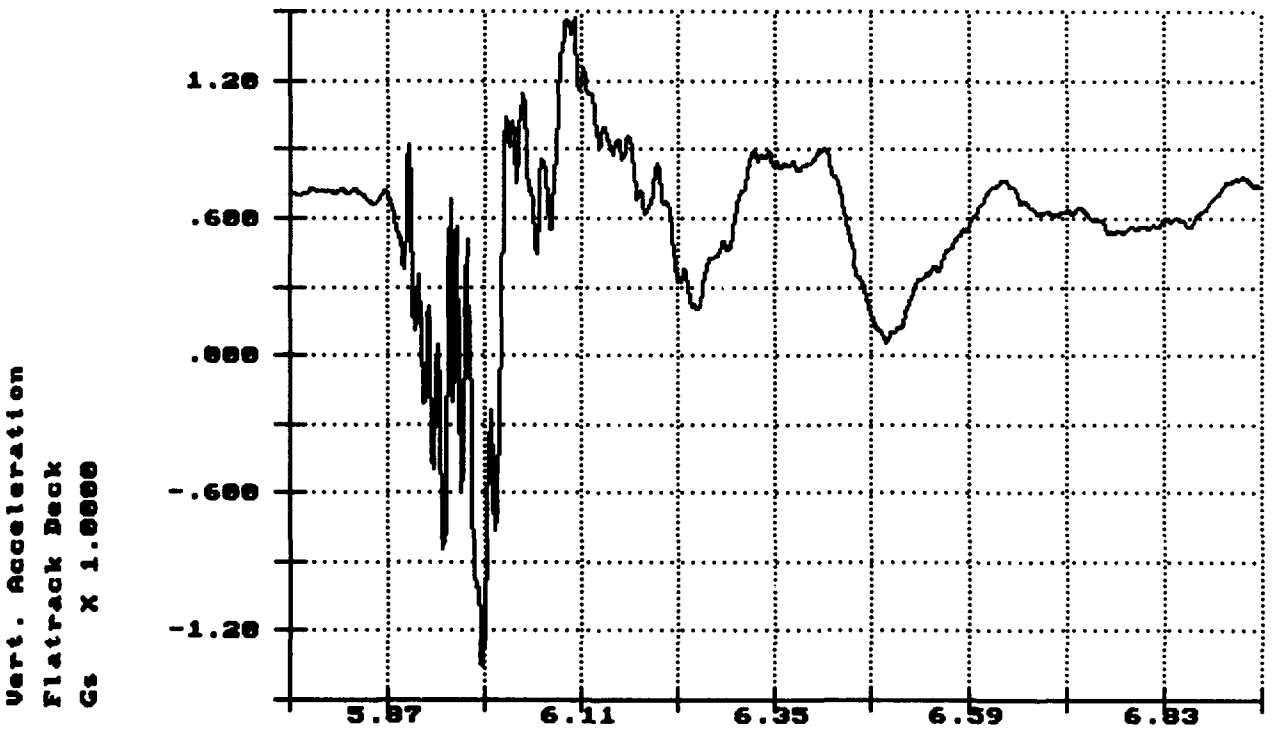
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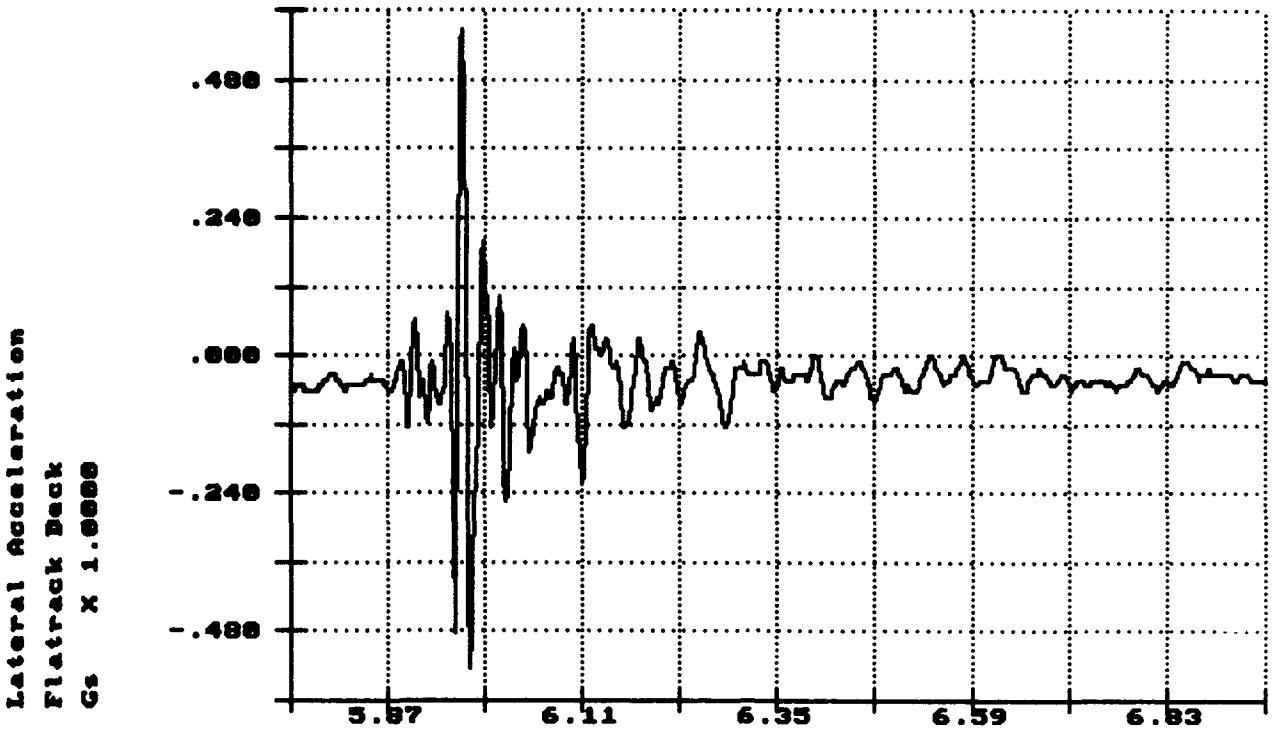
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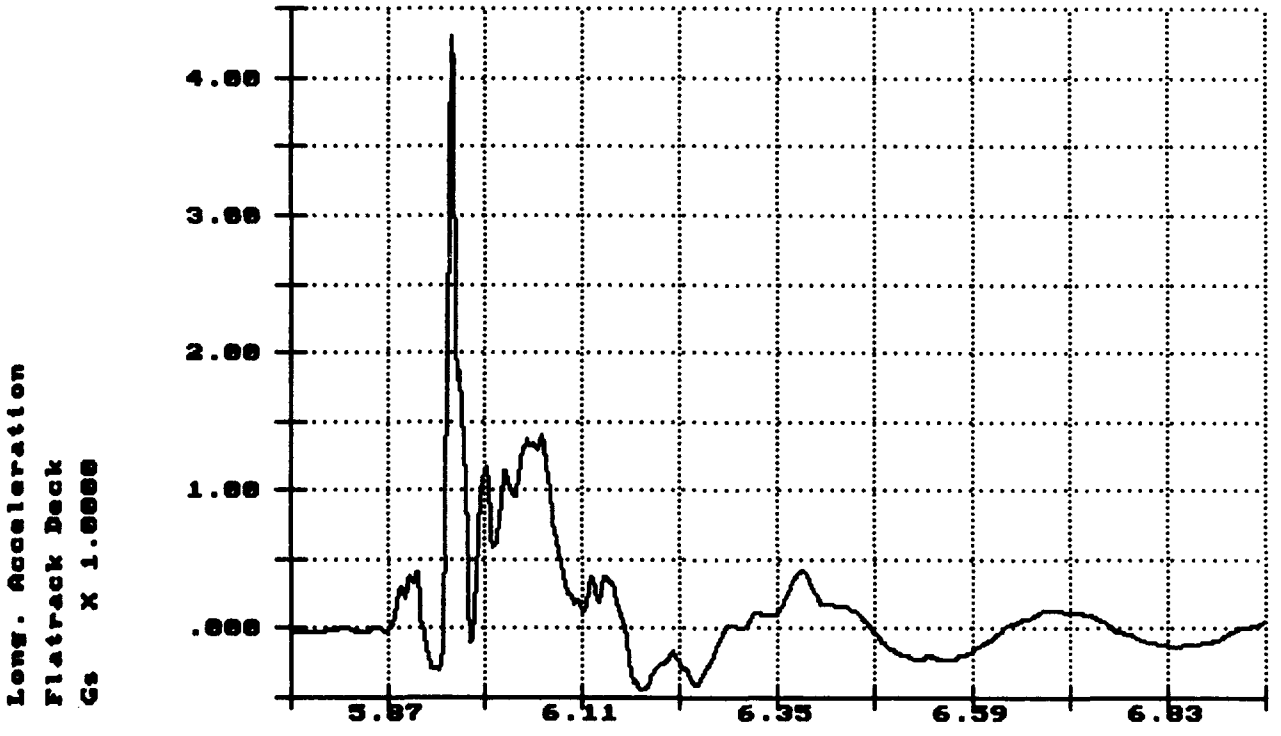
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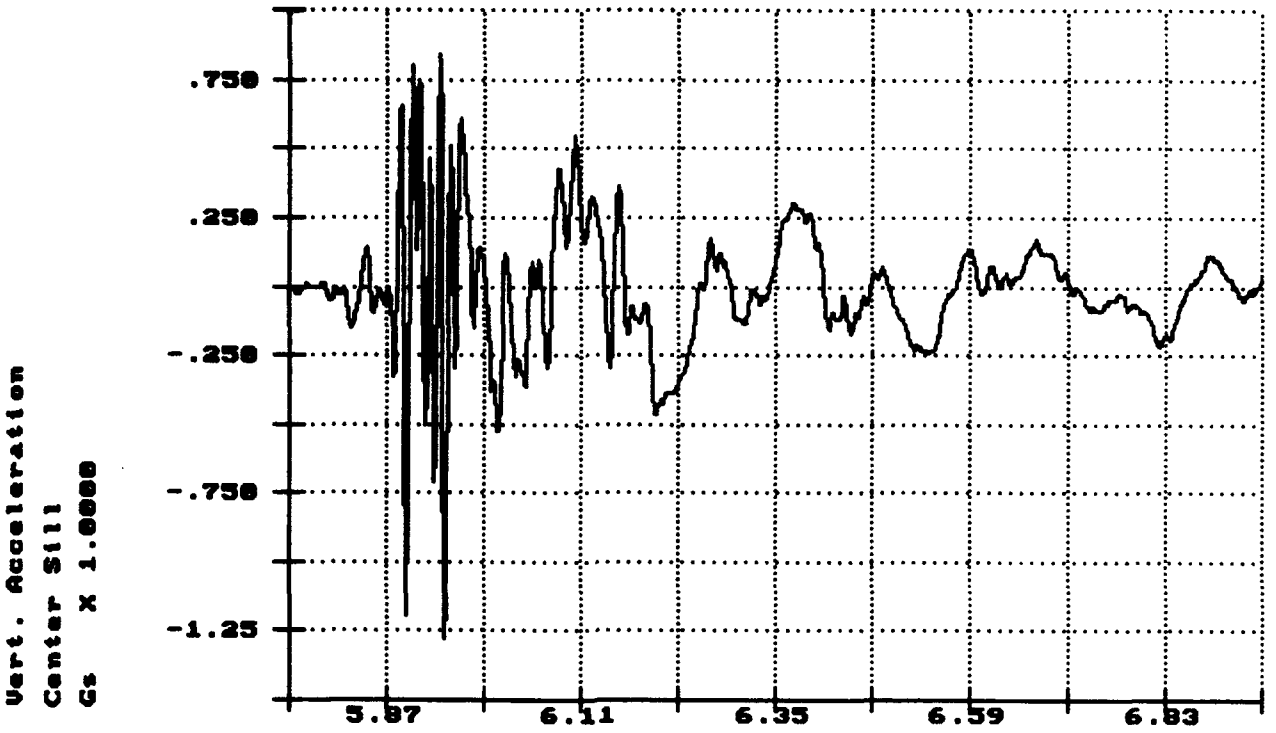
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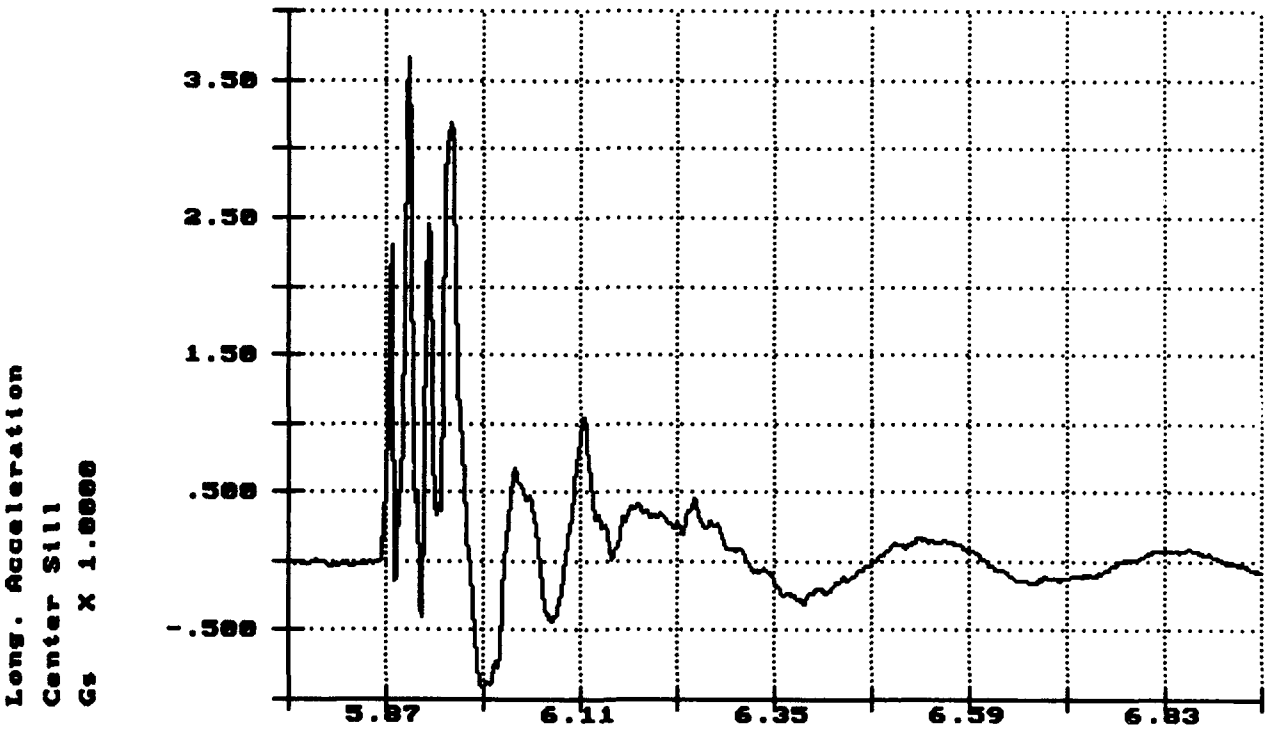
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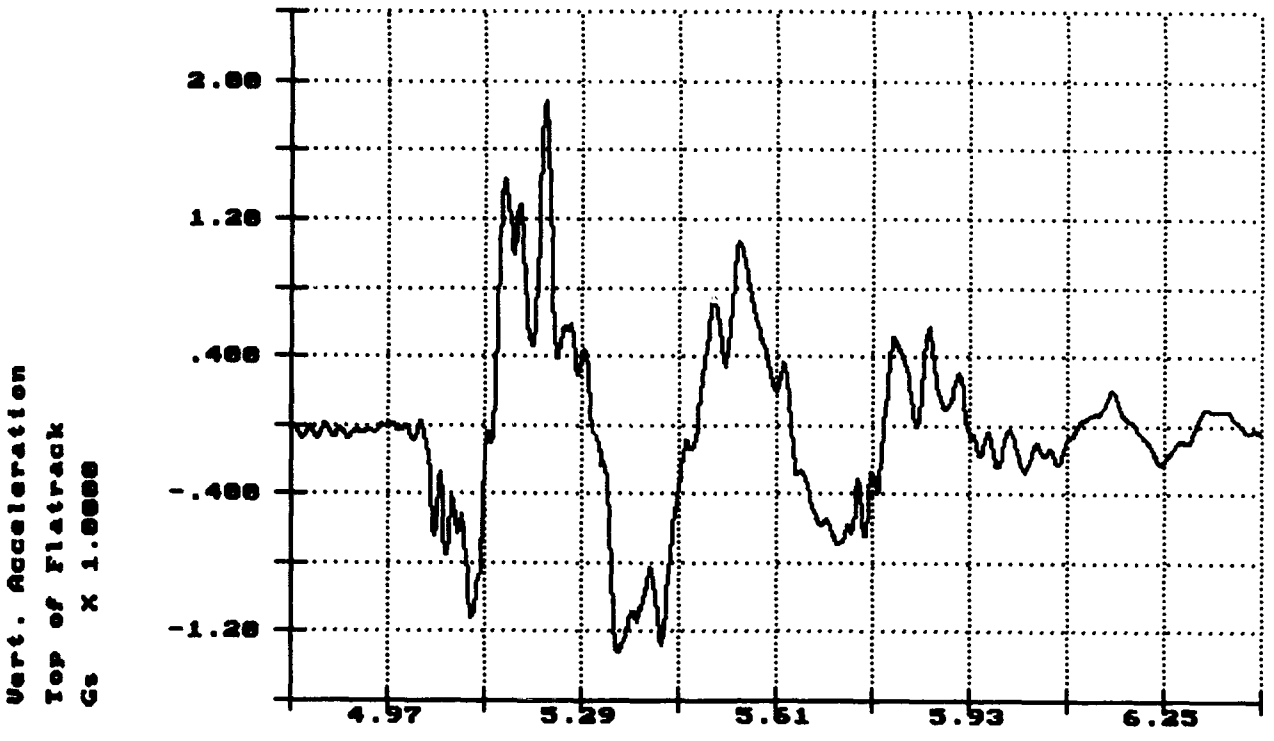
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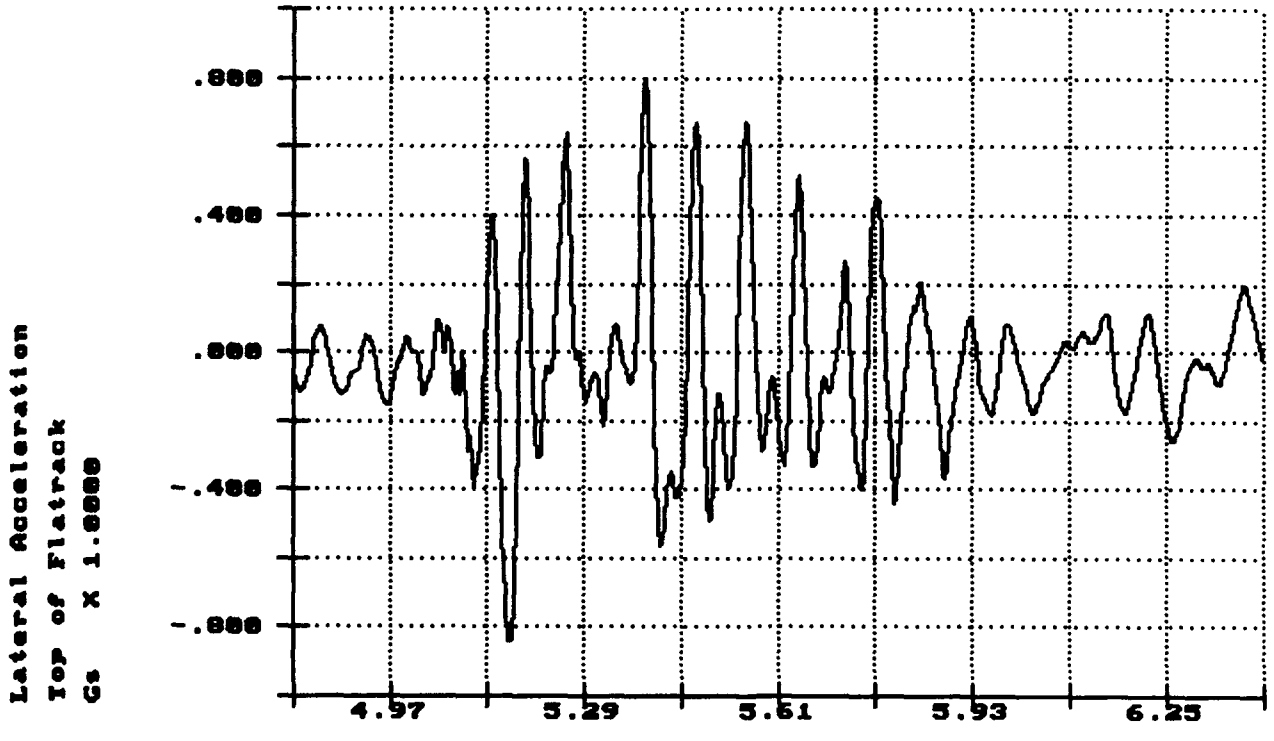
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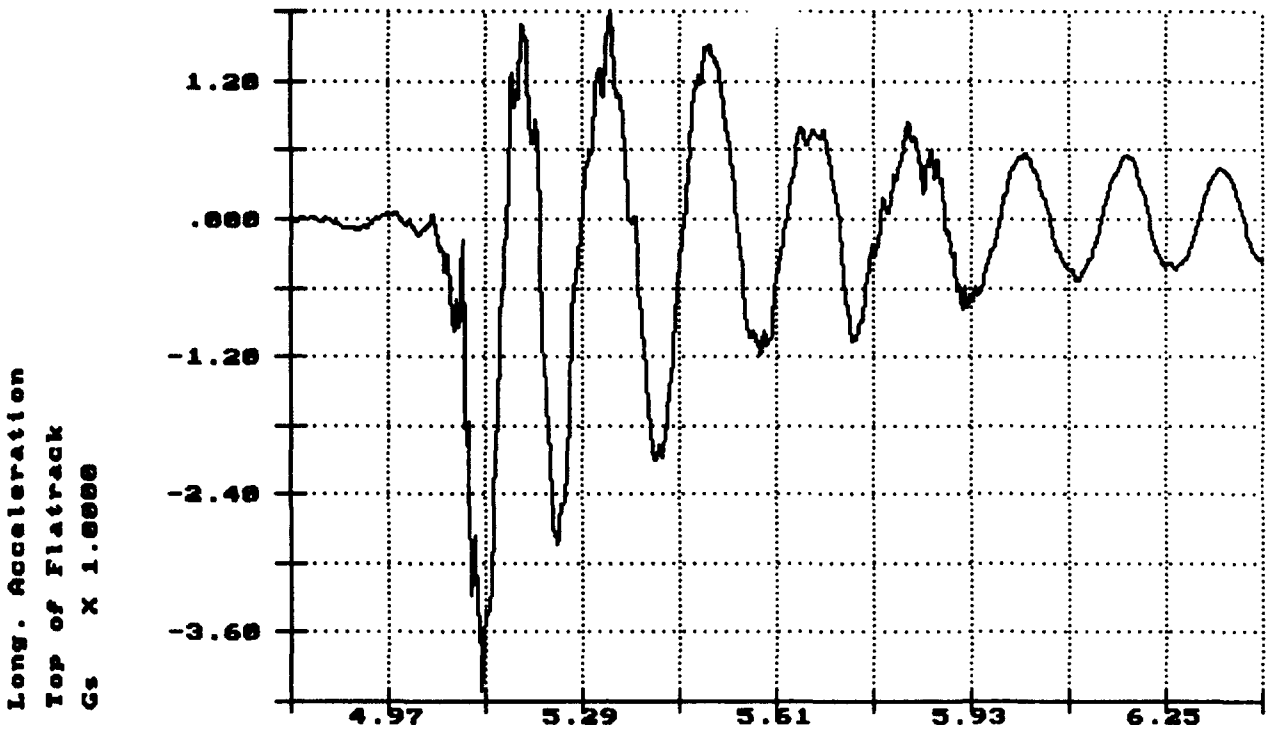
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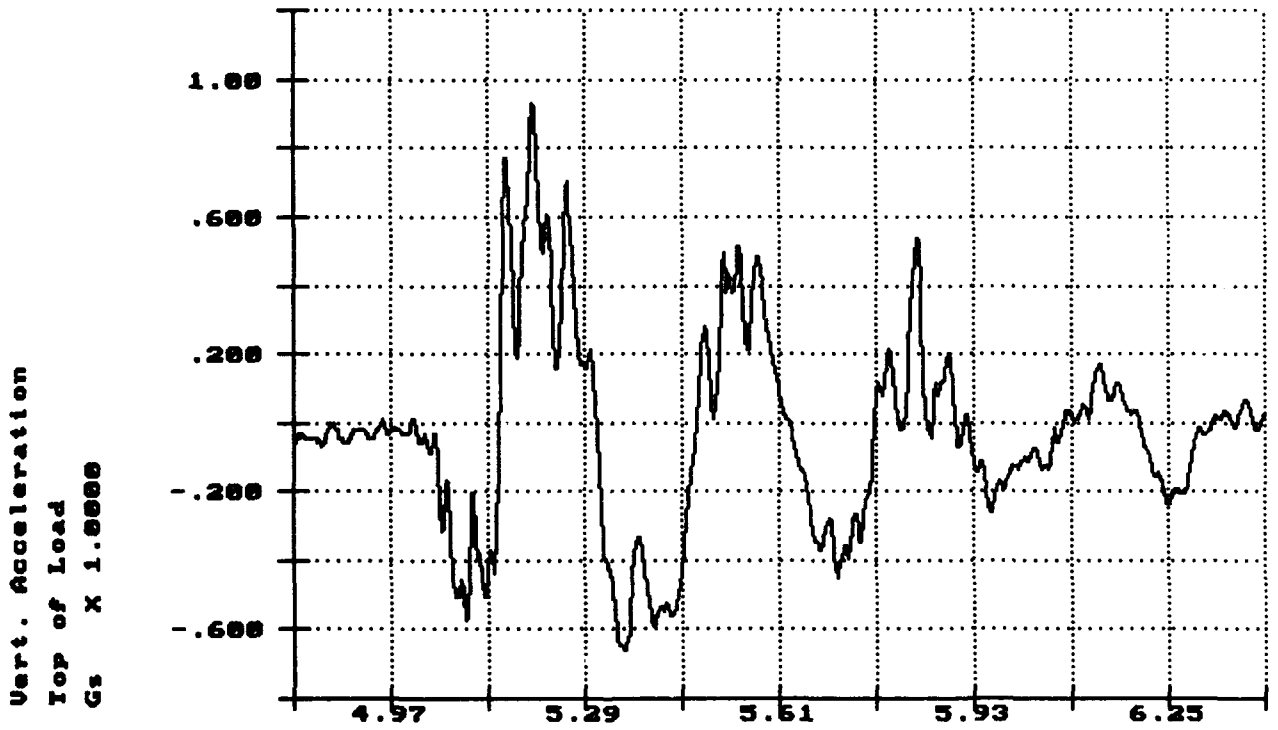
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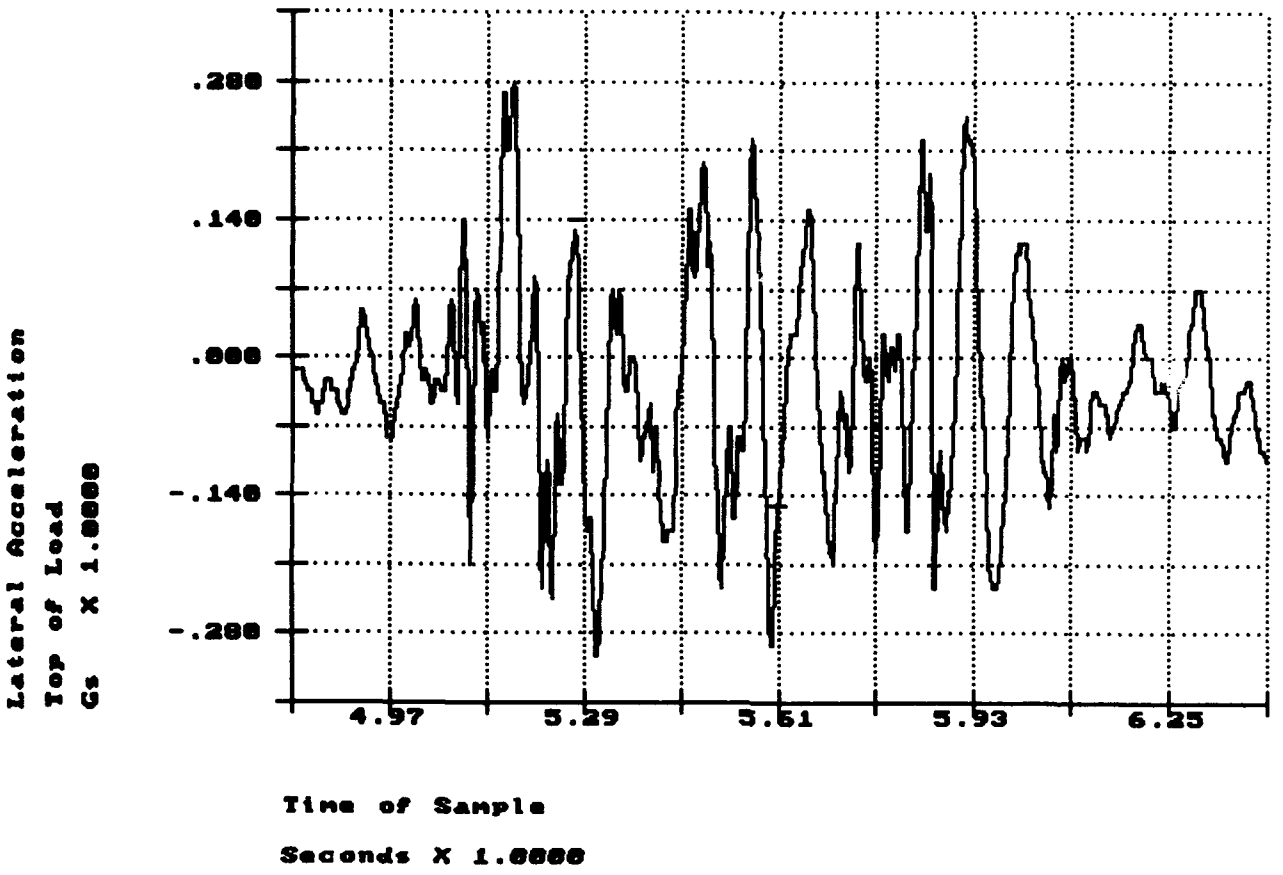
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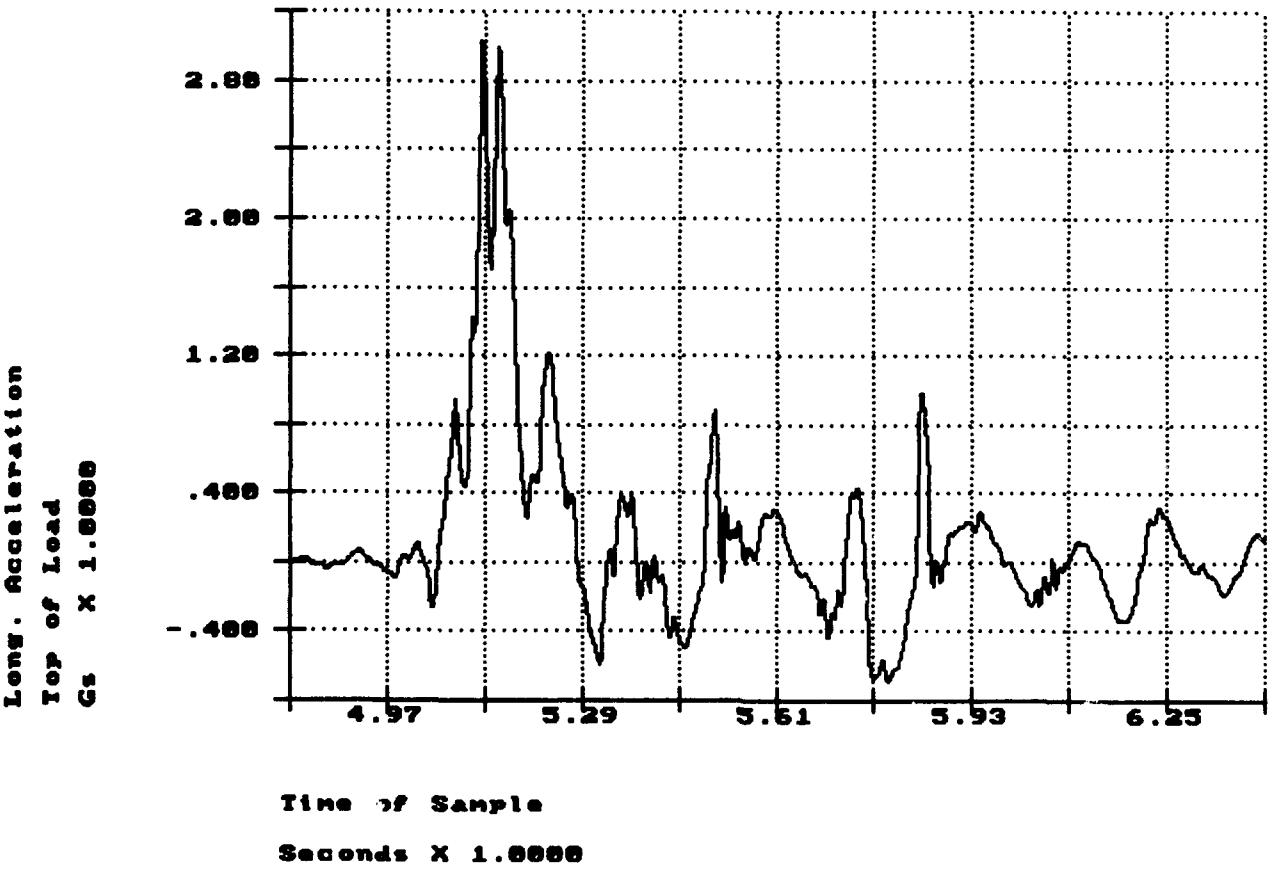
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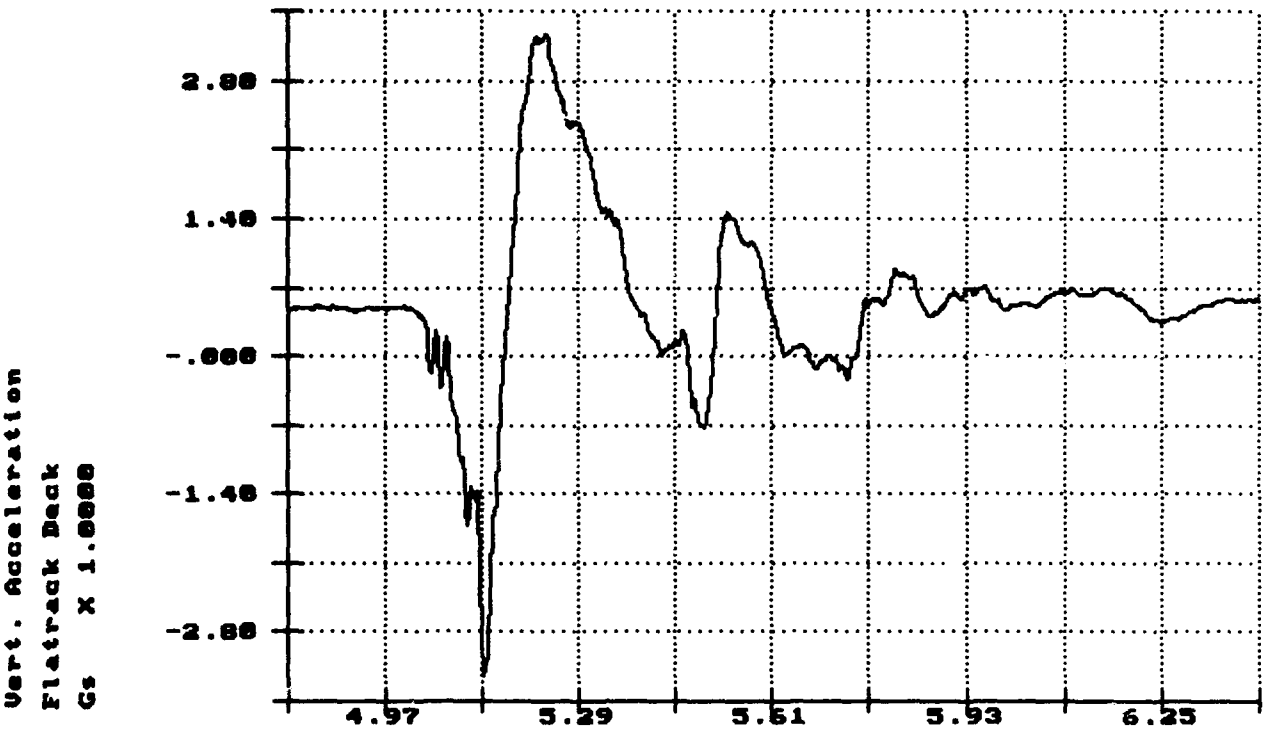
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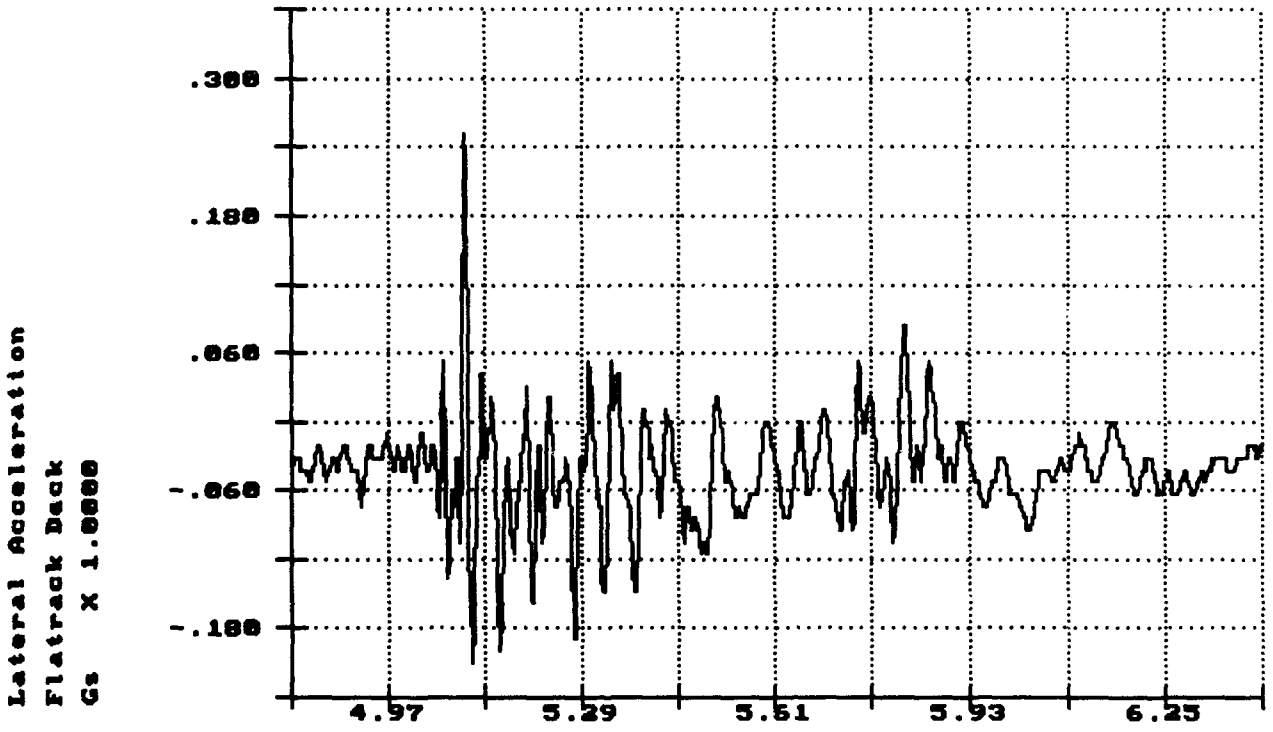
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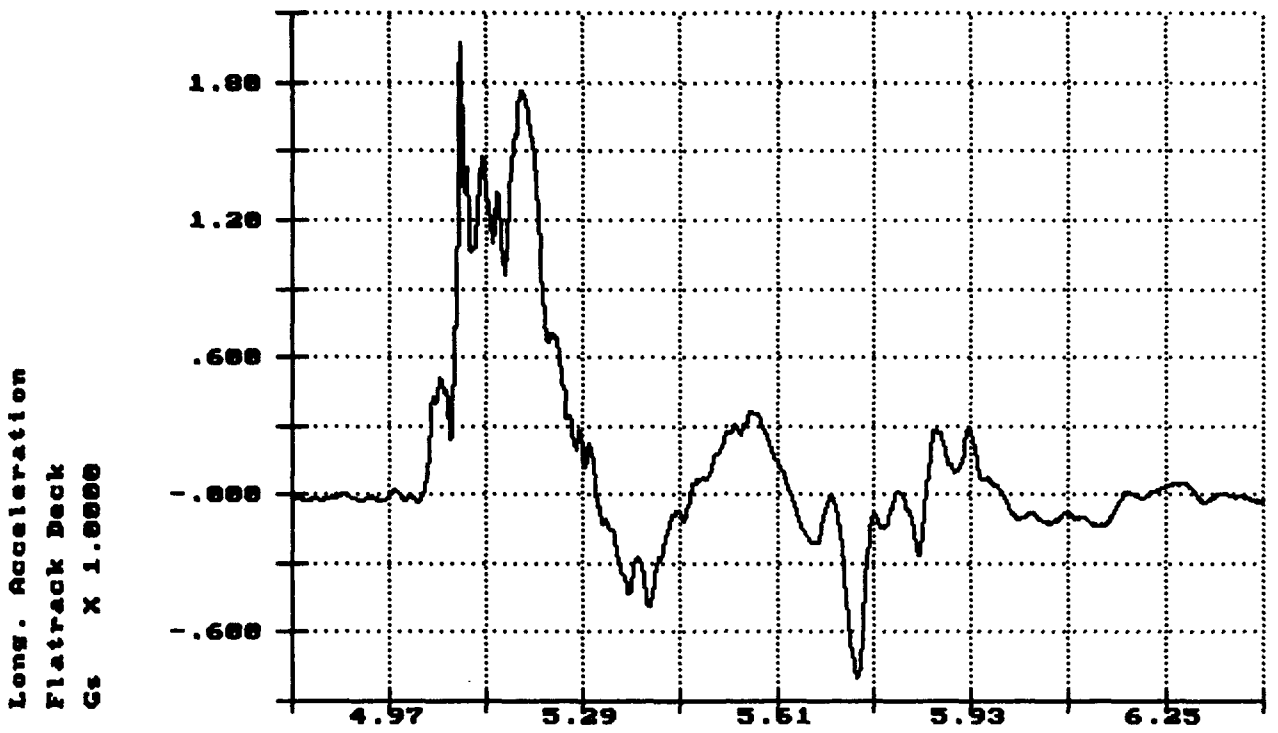
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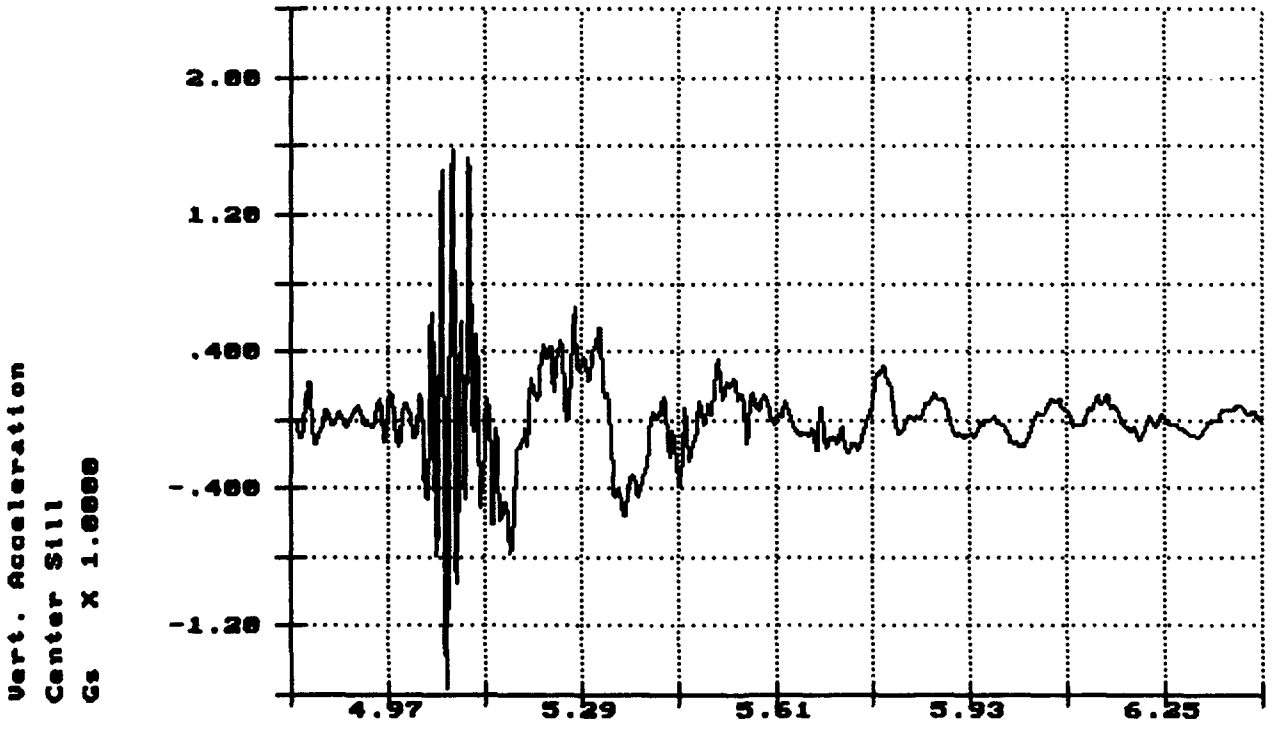
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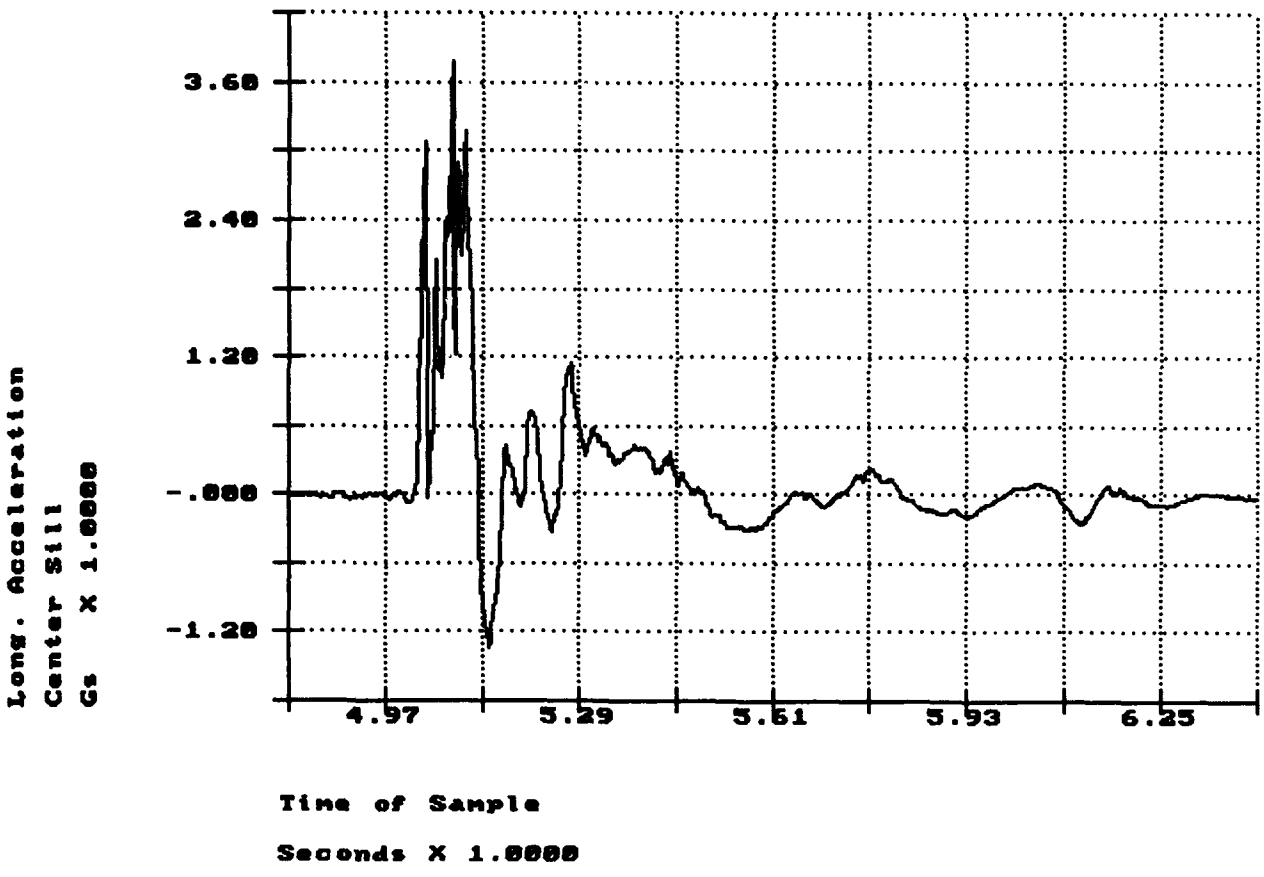
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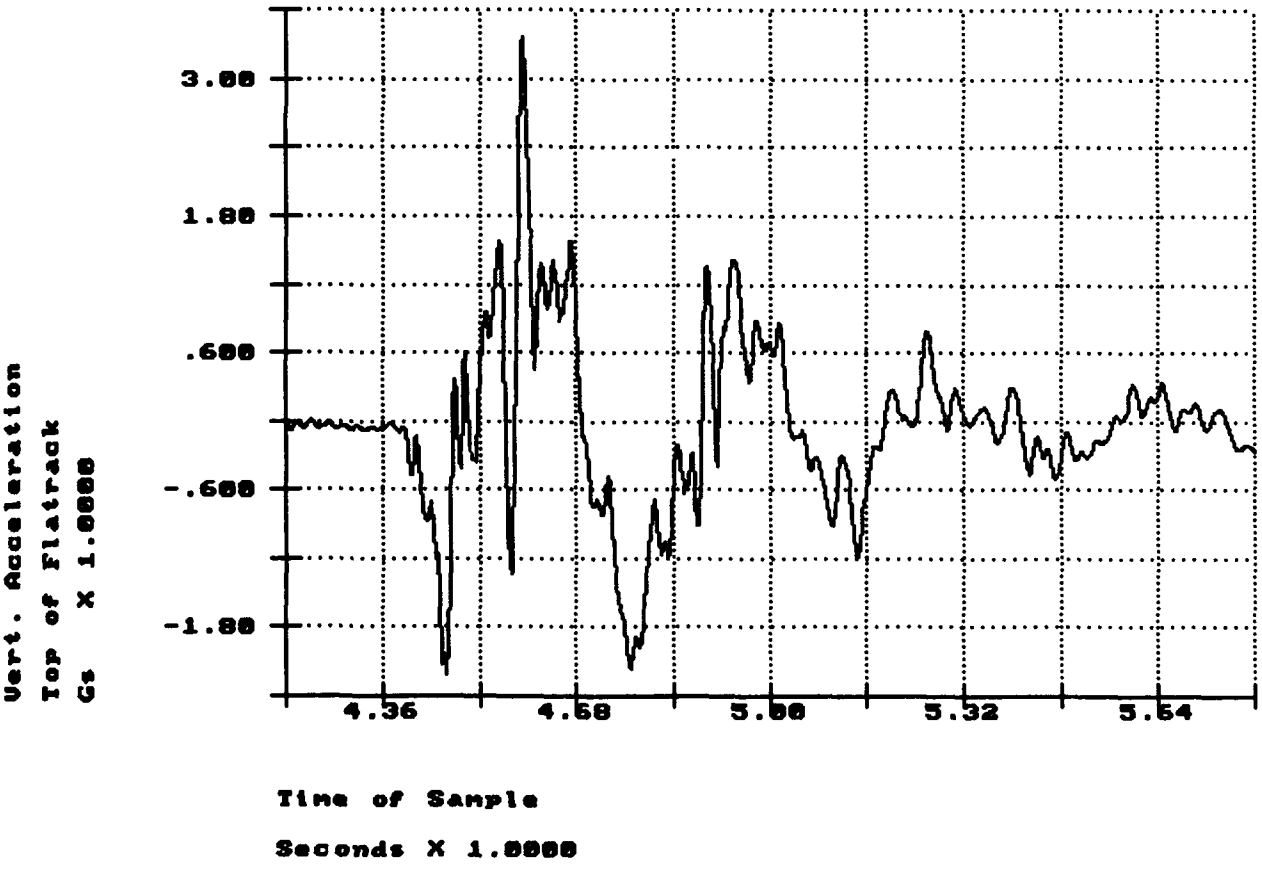
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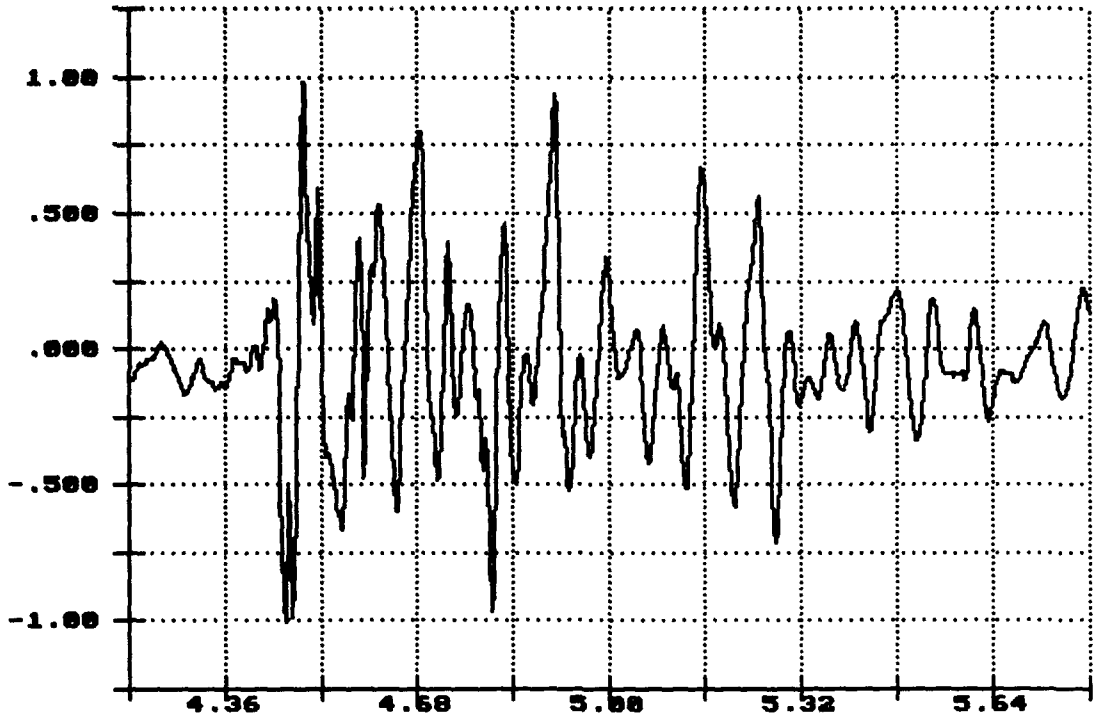
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R.I. of PLS Flatrack, Impact 4: 8.52MPH Nov 23 09:50:57 1993



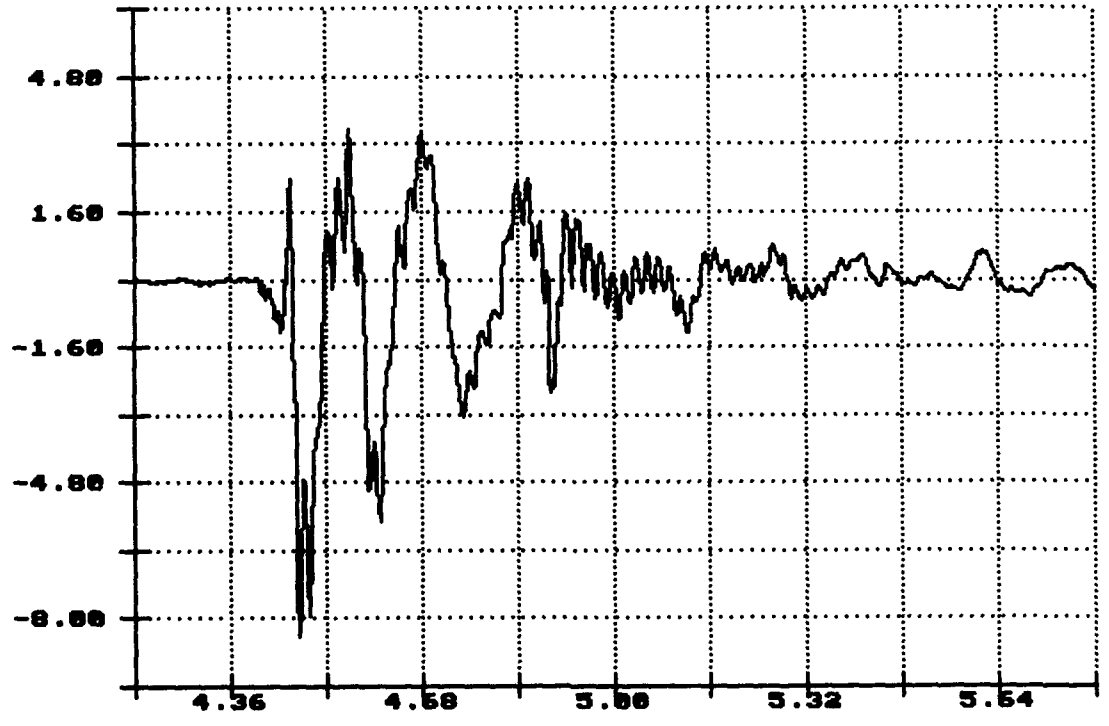
R.I. of PLS Flatrack, Impact 4: 8.52MPH Nov 23 09:50:57 1993



Lateral Acceleration
Top of Flatrack
Gs X 1.0000

Time of Sample
Seconds X 1.0000

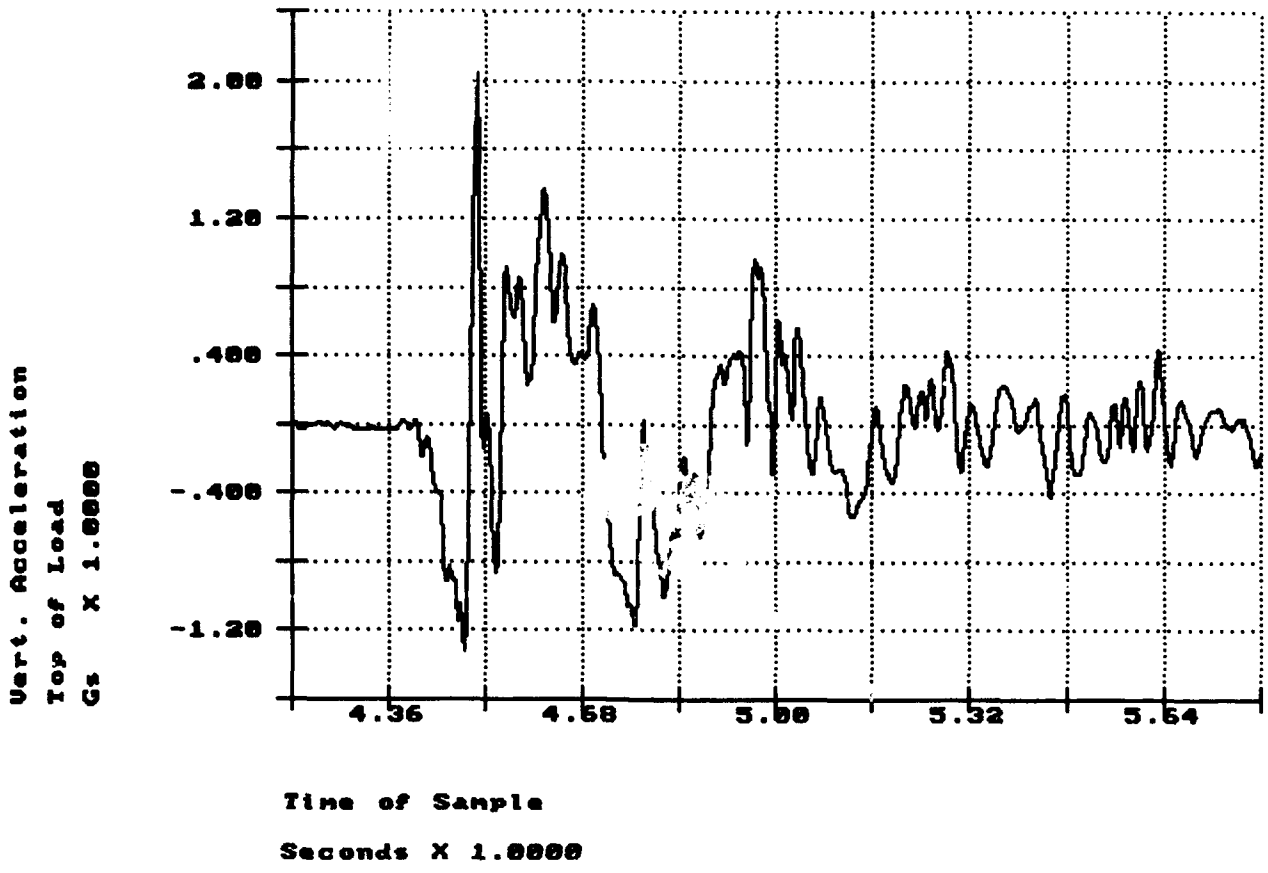
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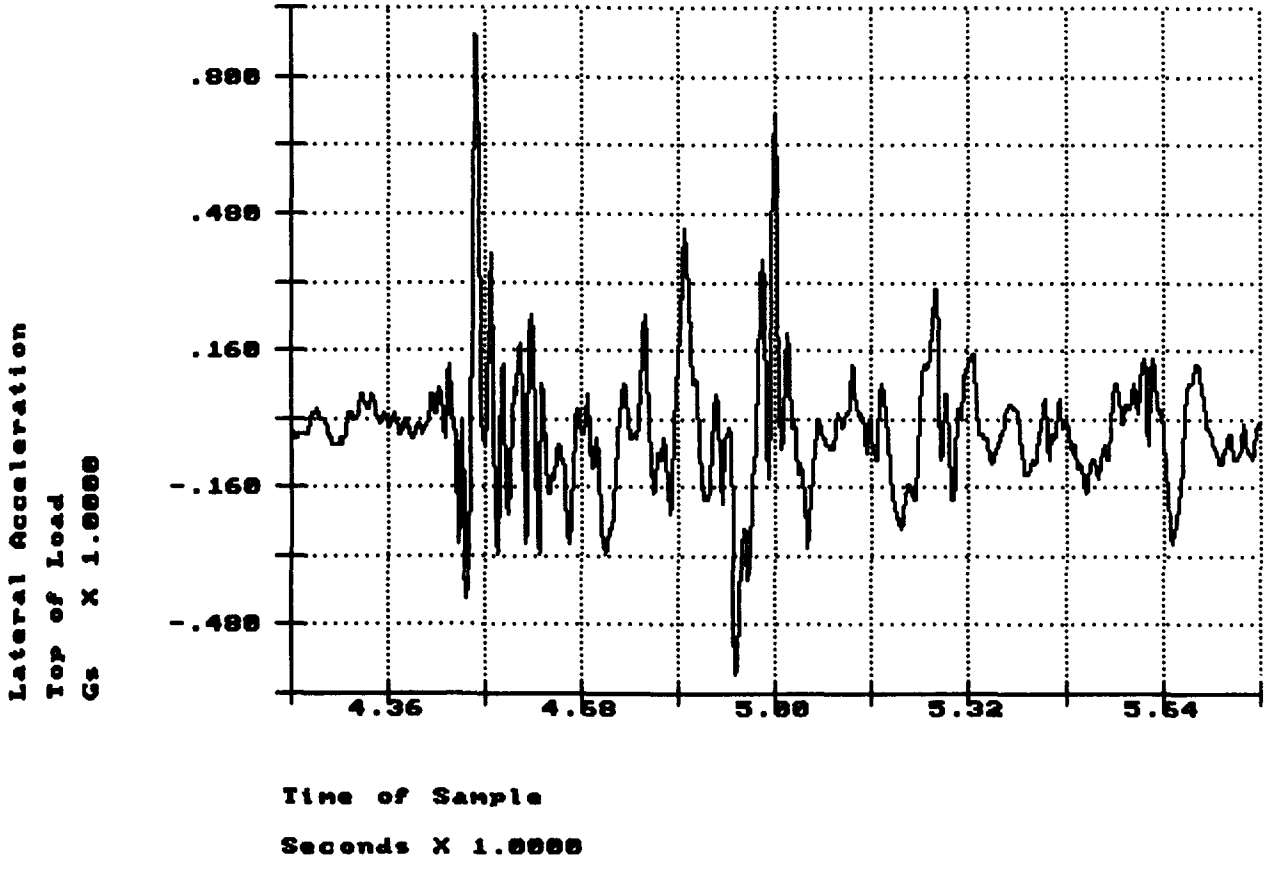
Long. Acceleration
Top of Flatrack
Gs X 1.0000

Time of Sample
Seconds X 1.0000

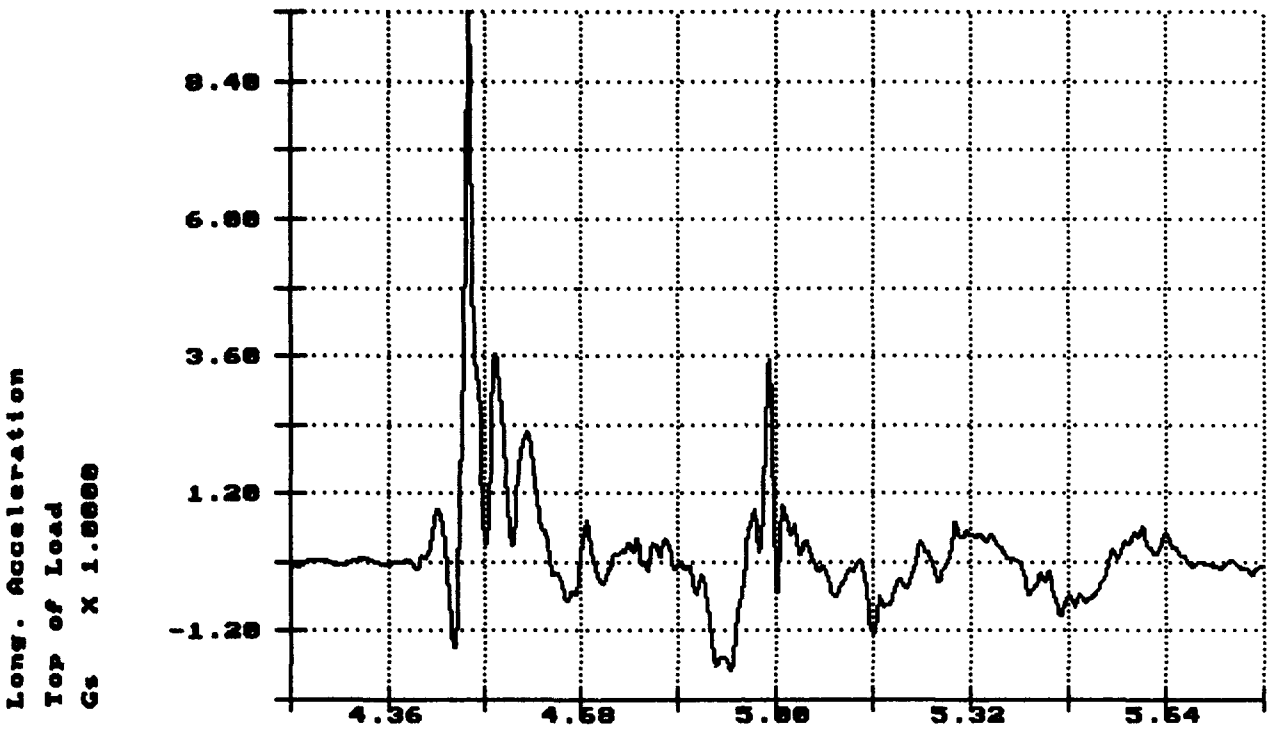
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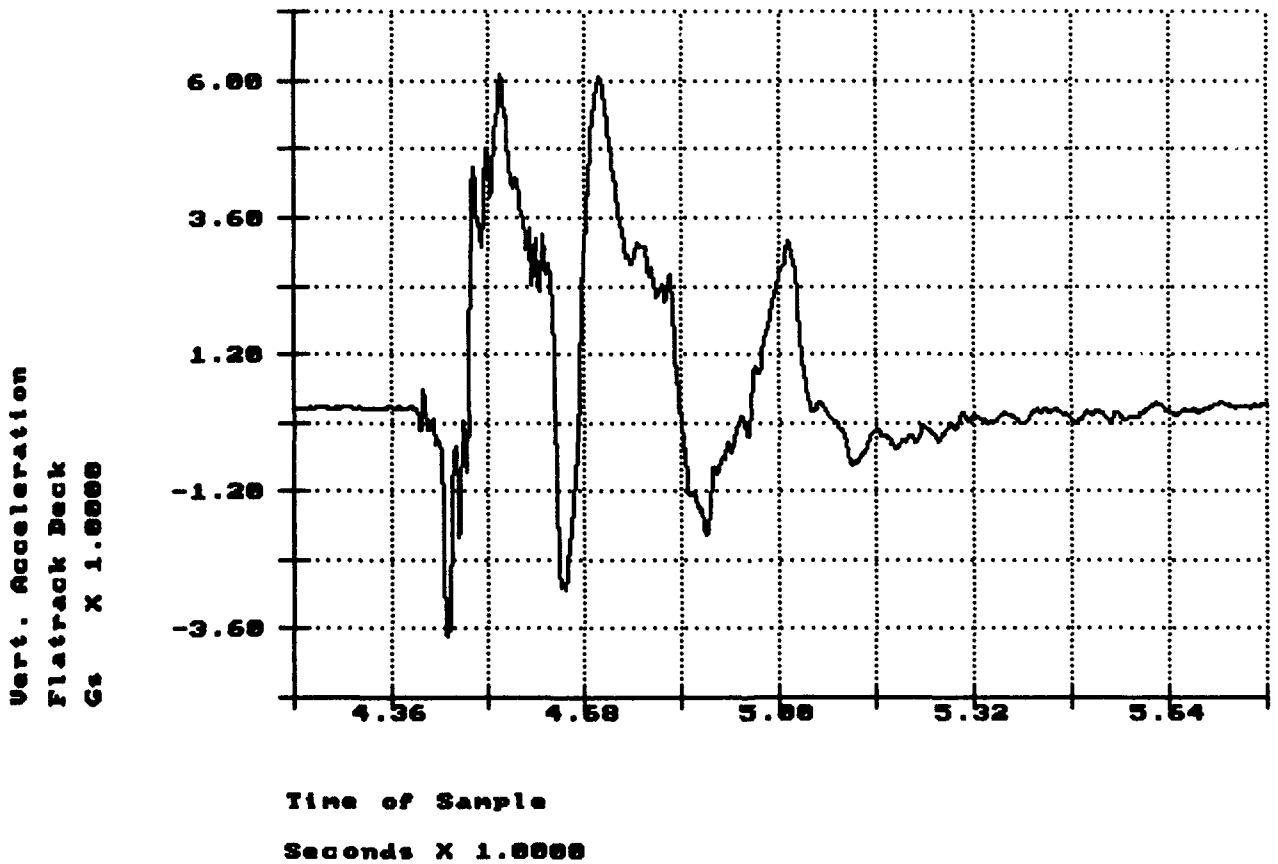
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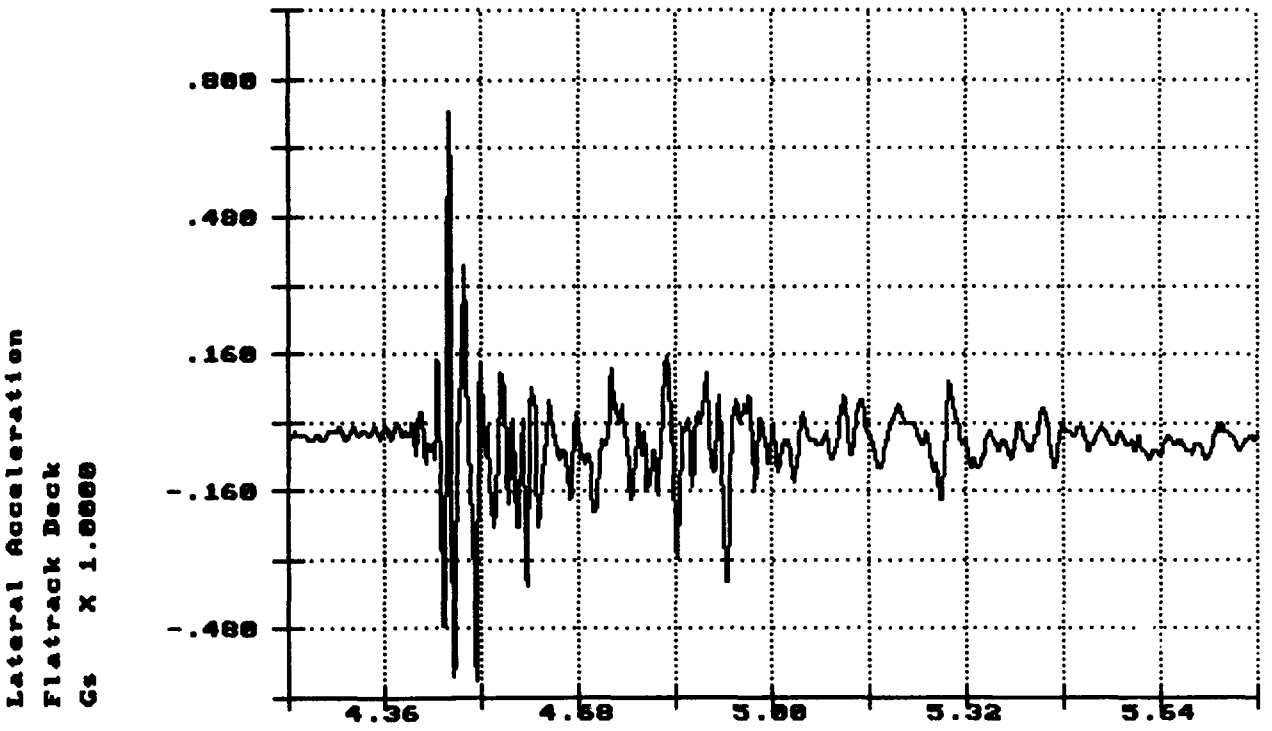
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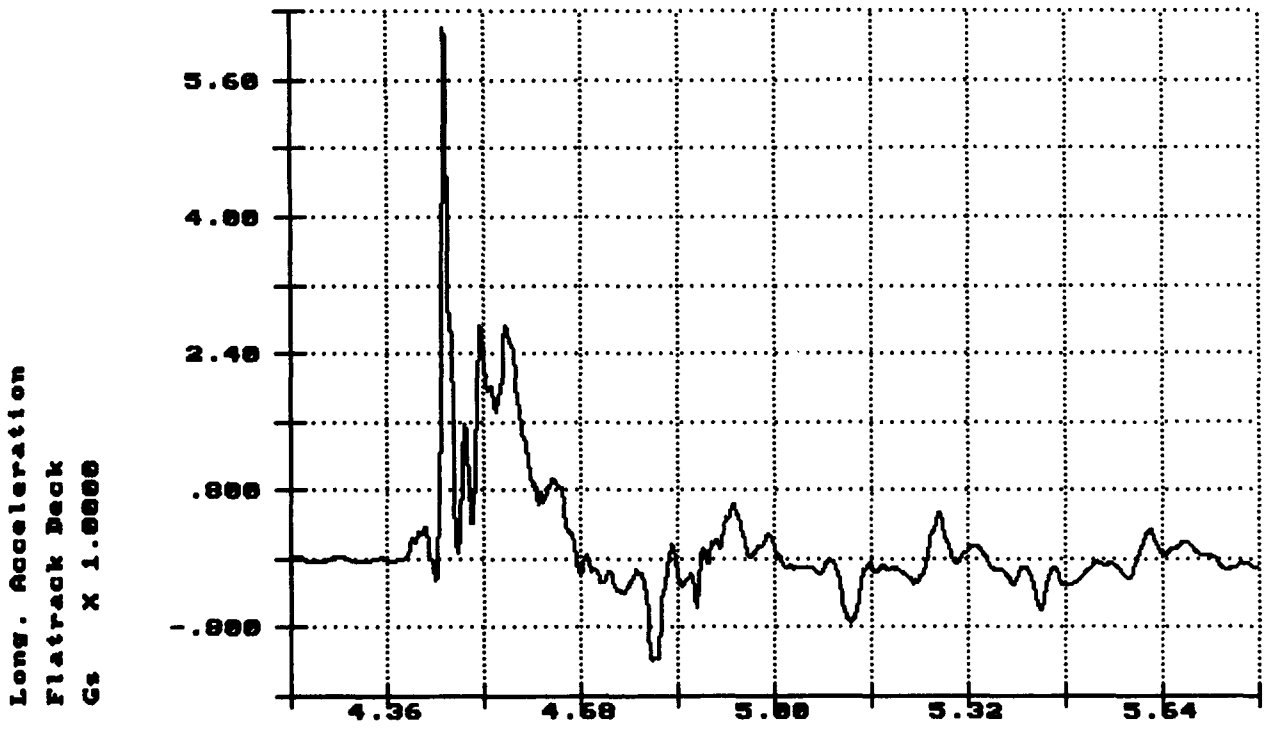
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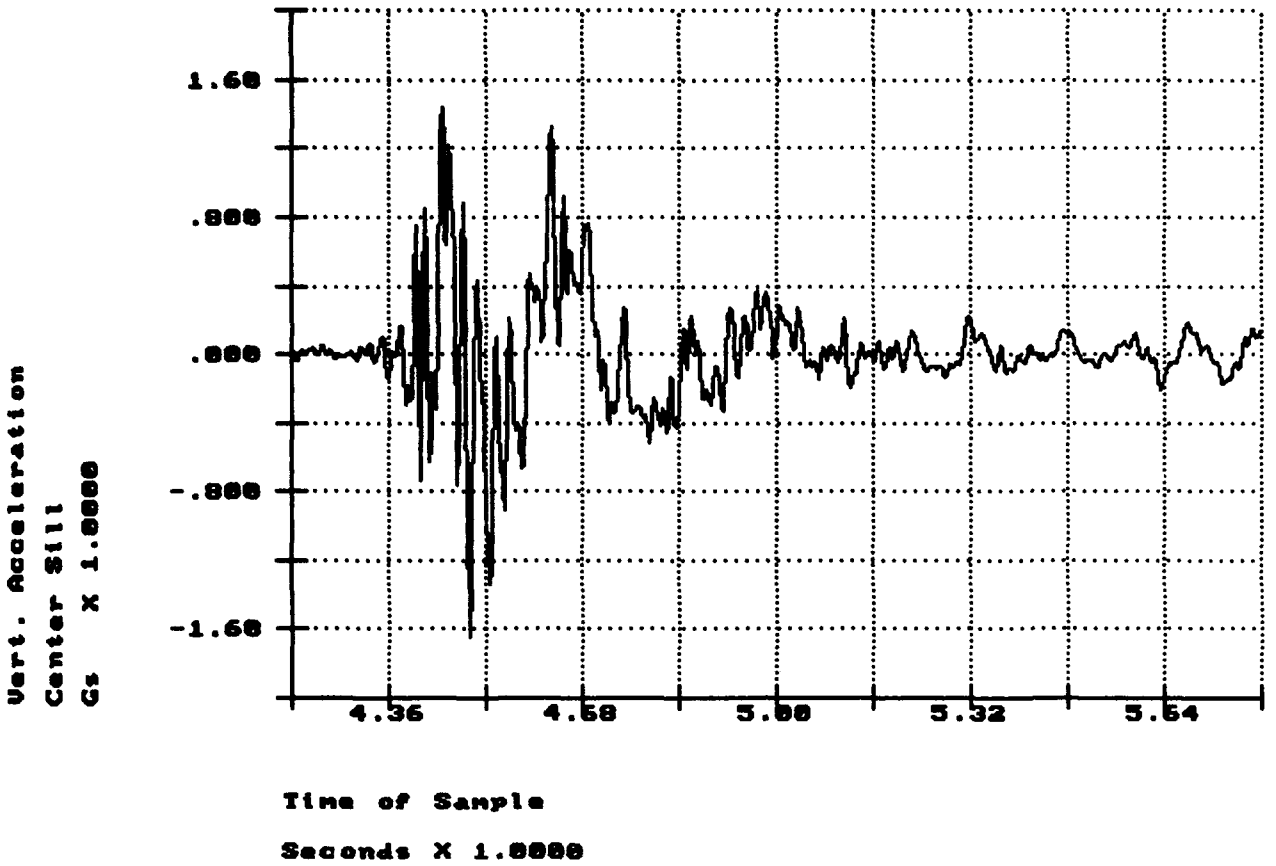
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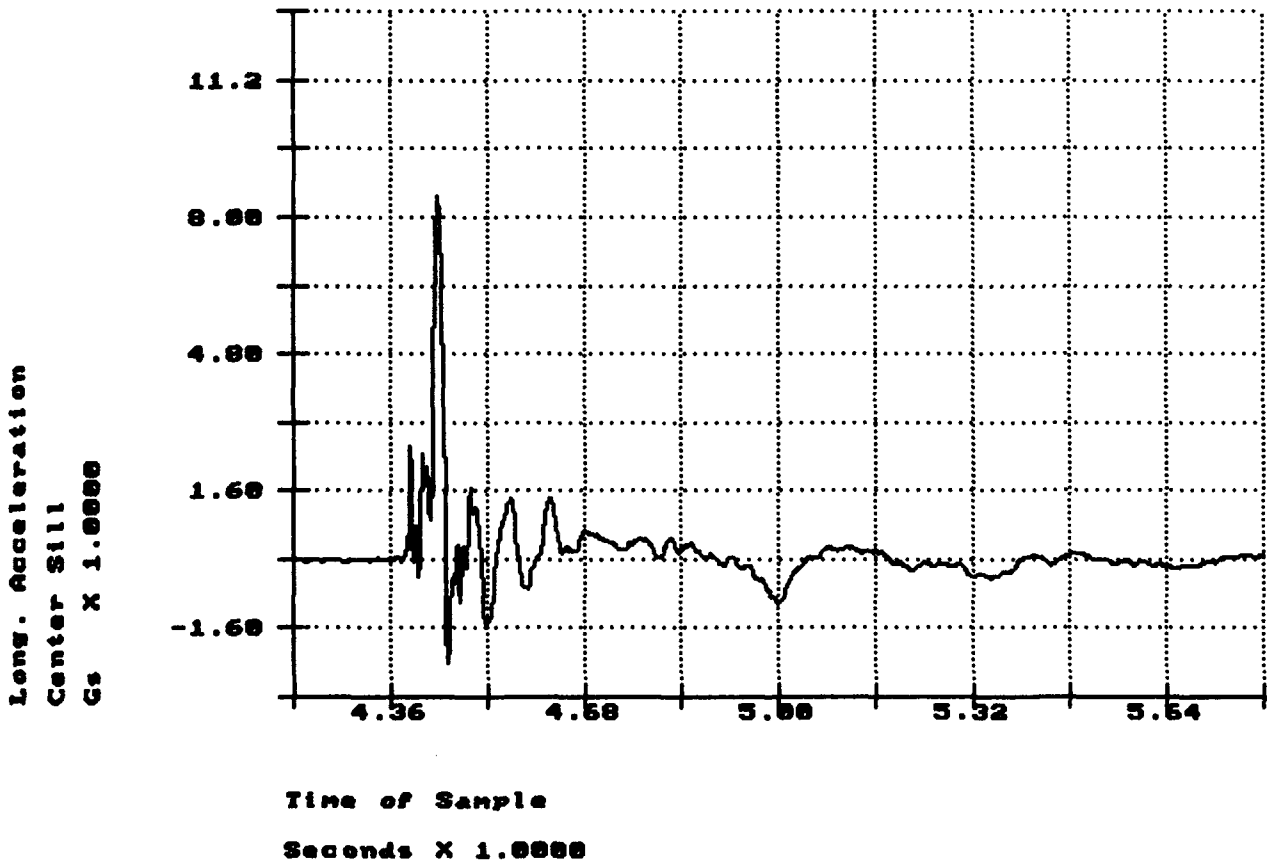
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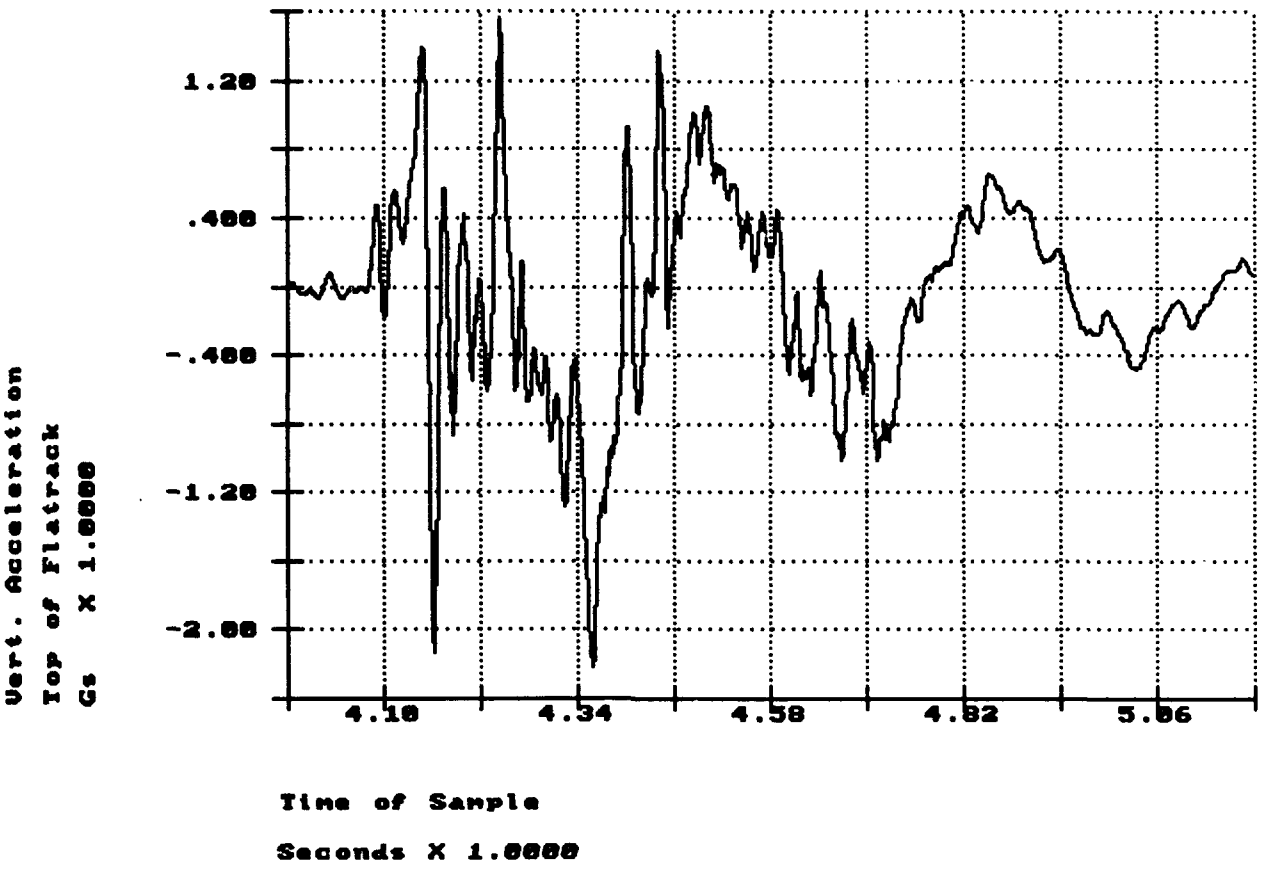
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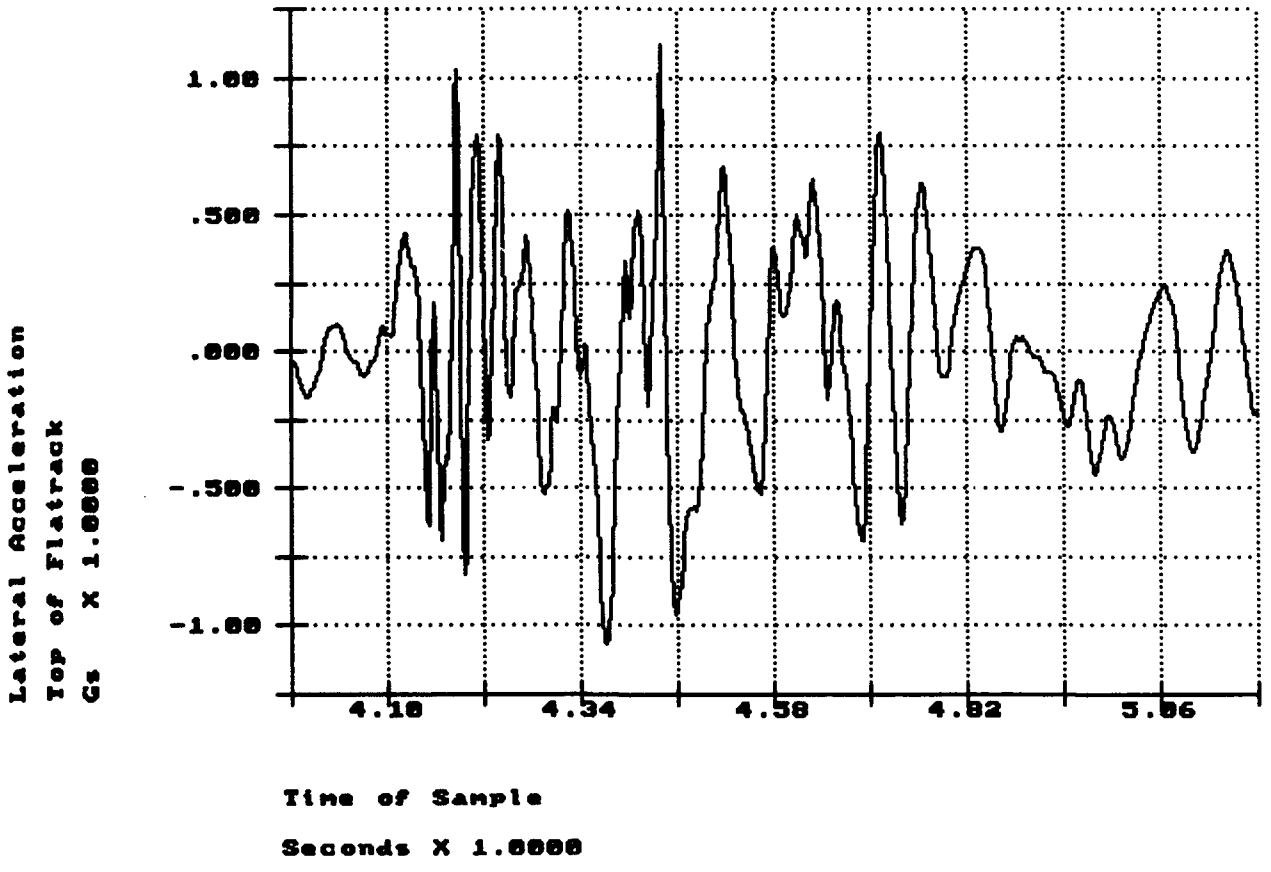
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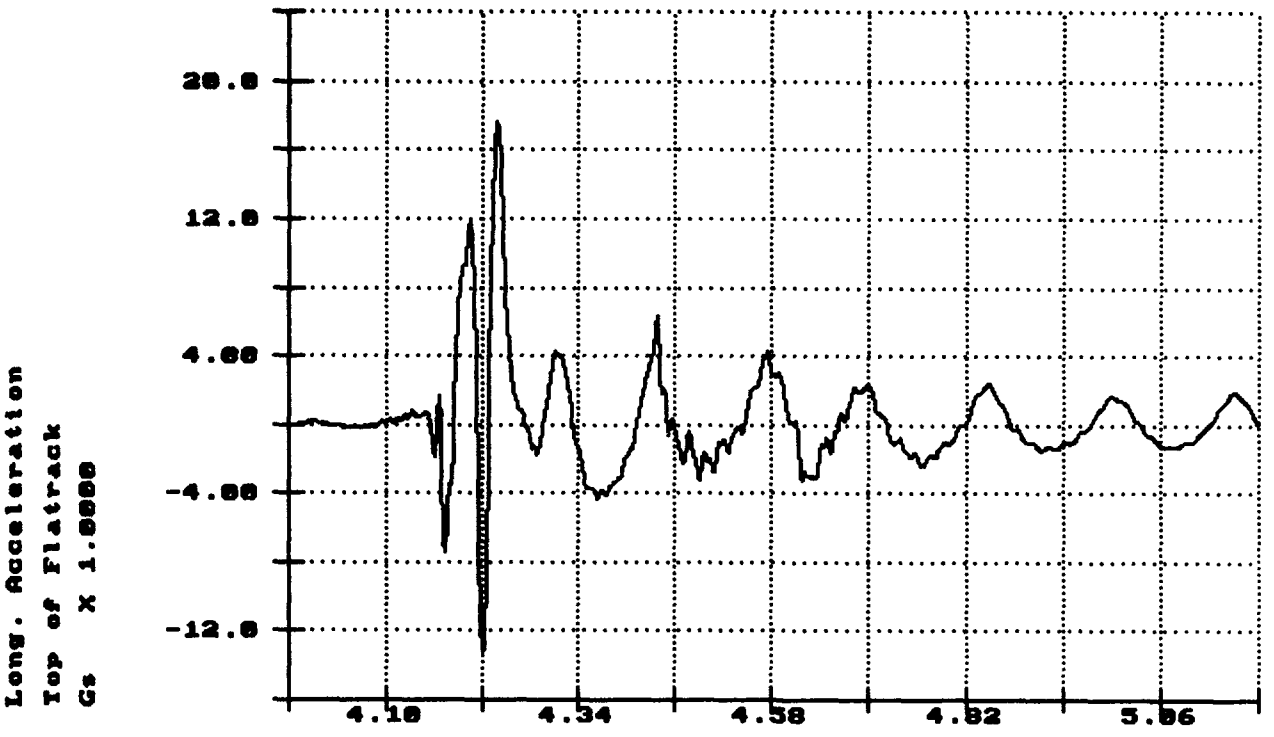
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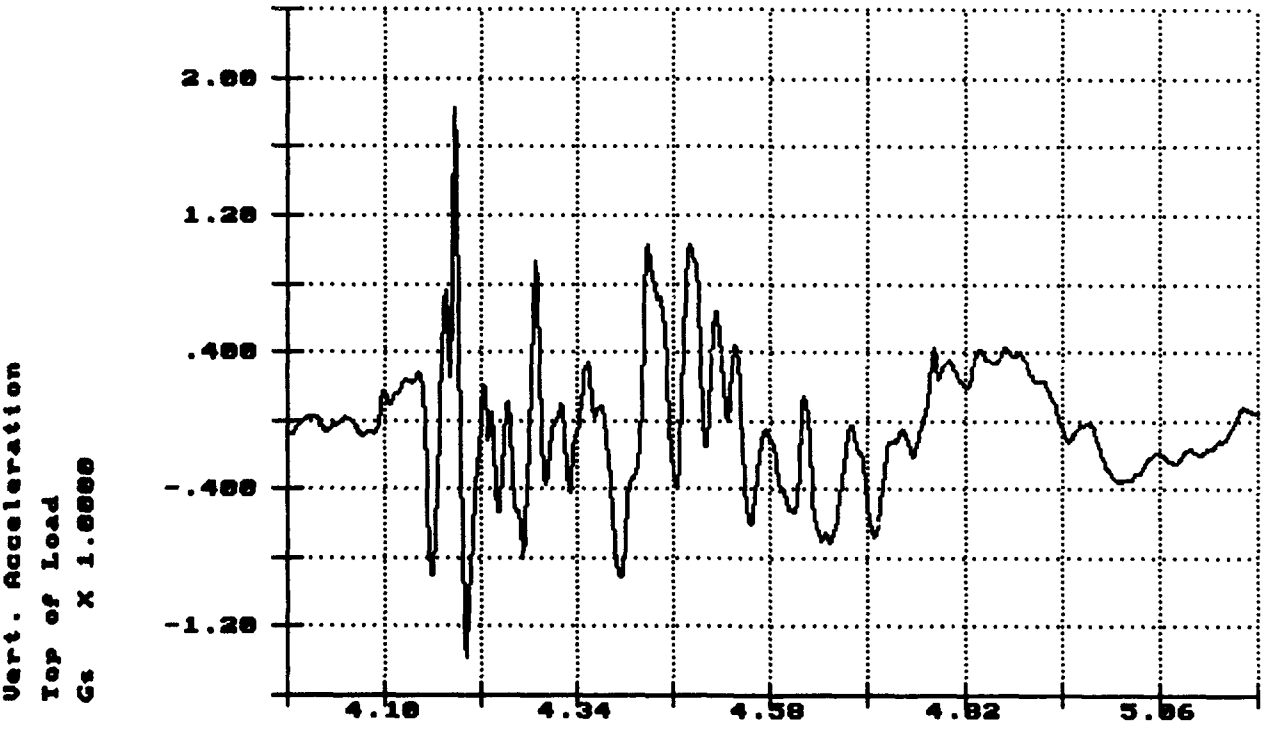
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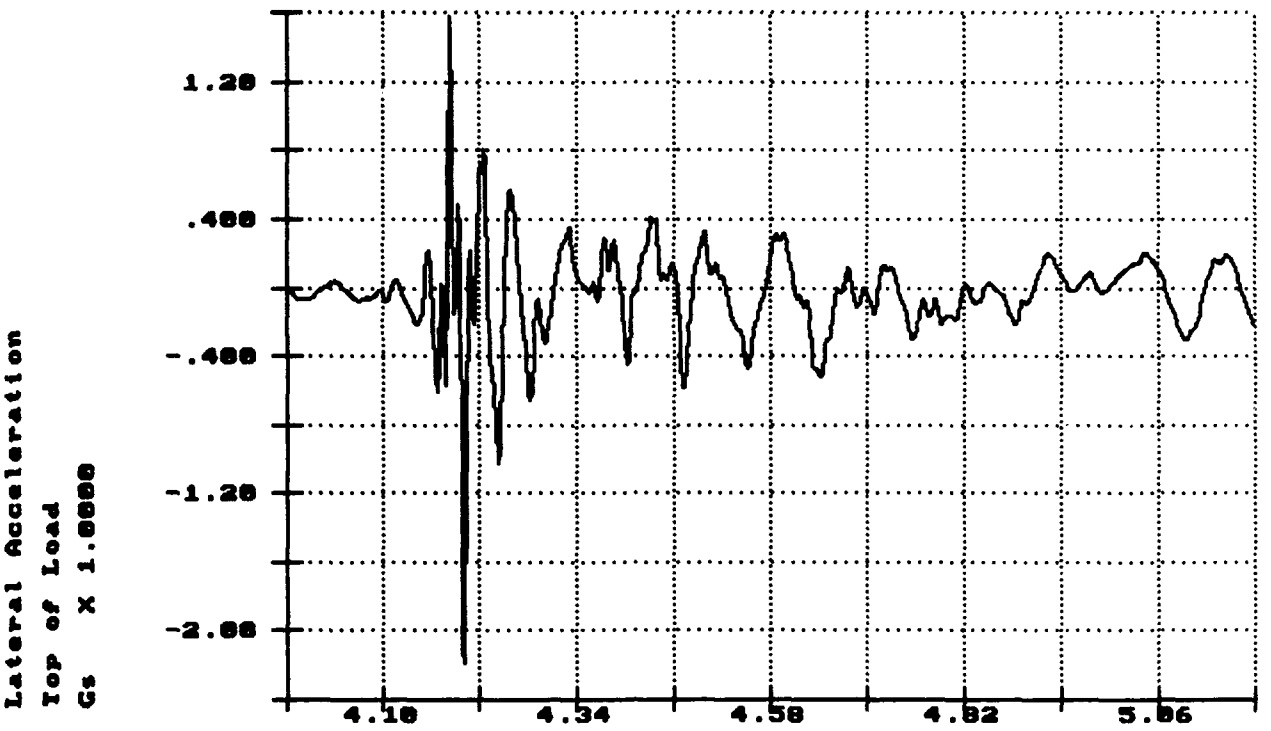
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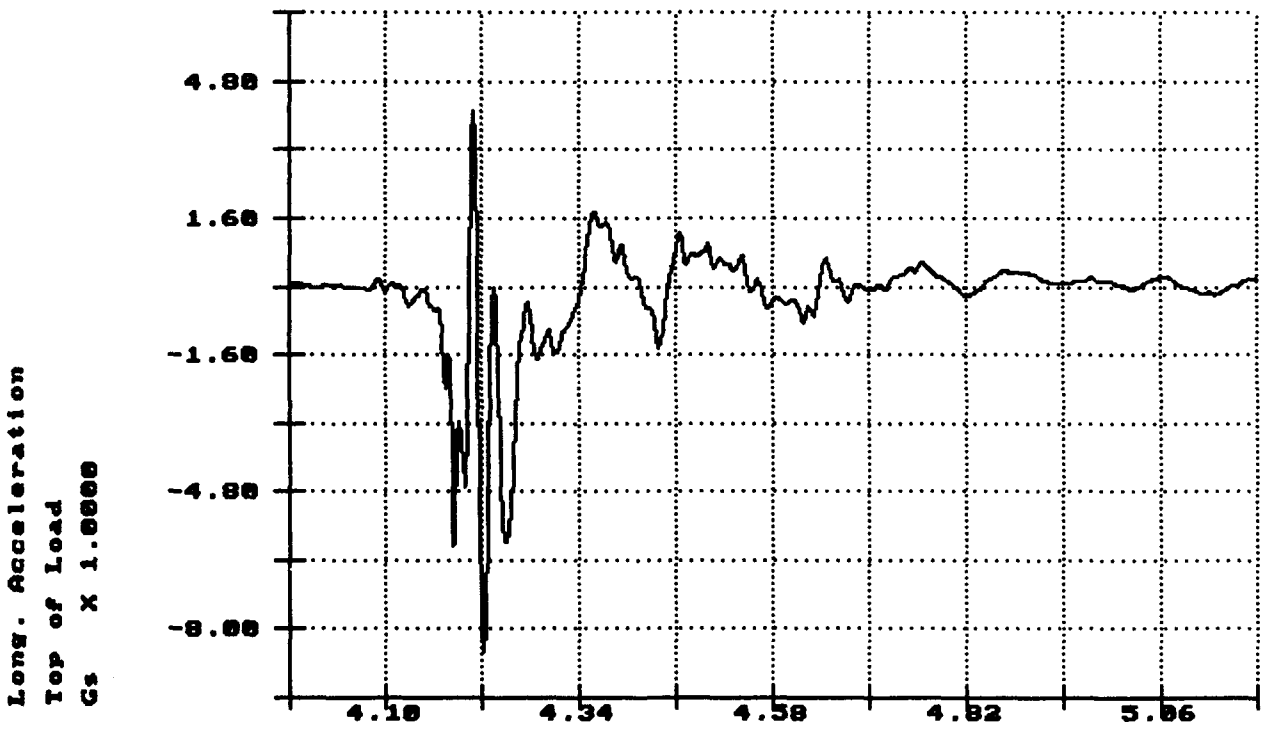
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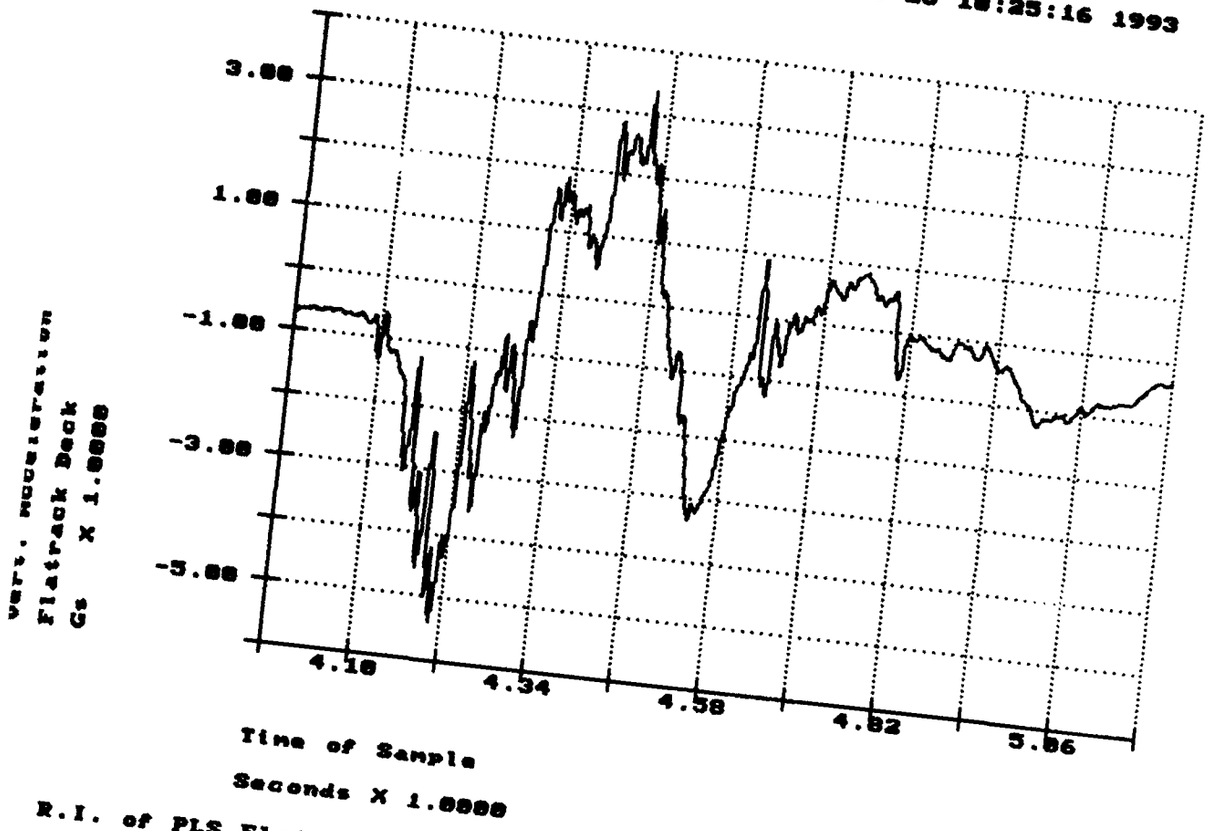
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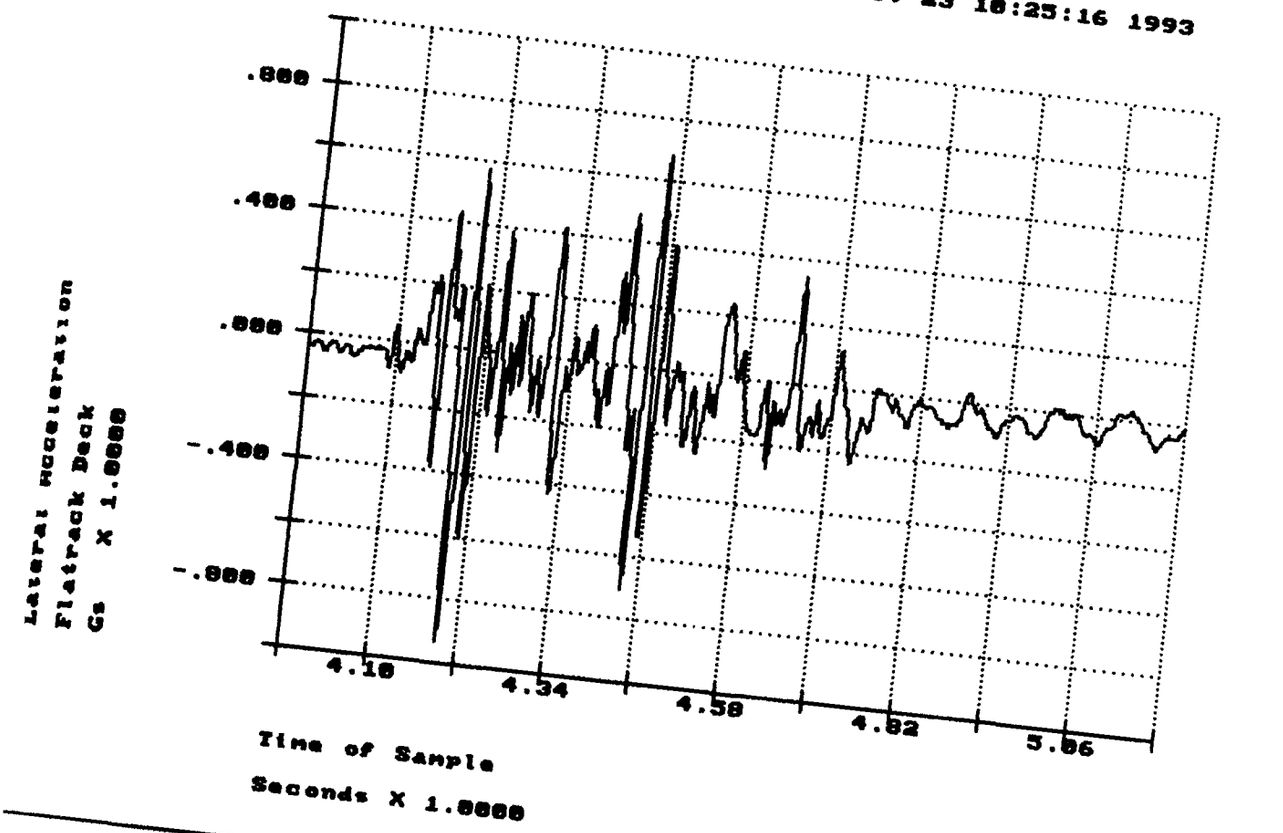
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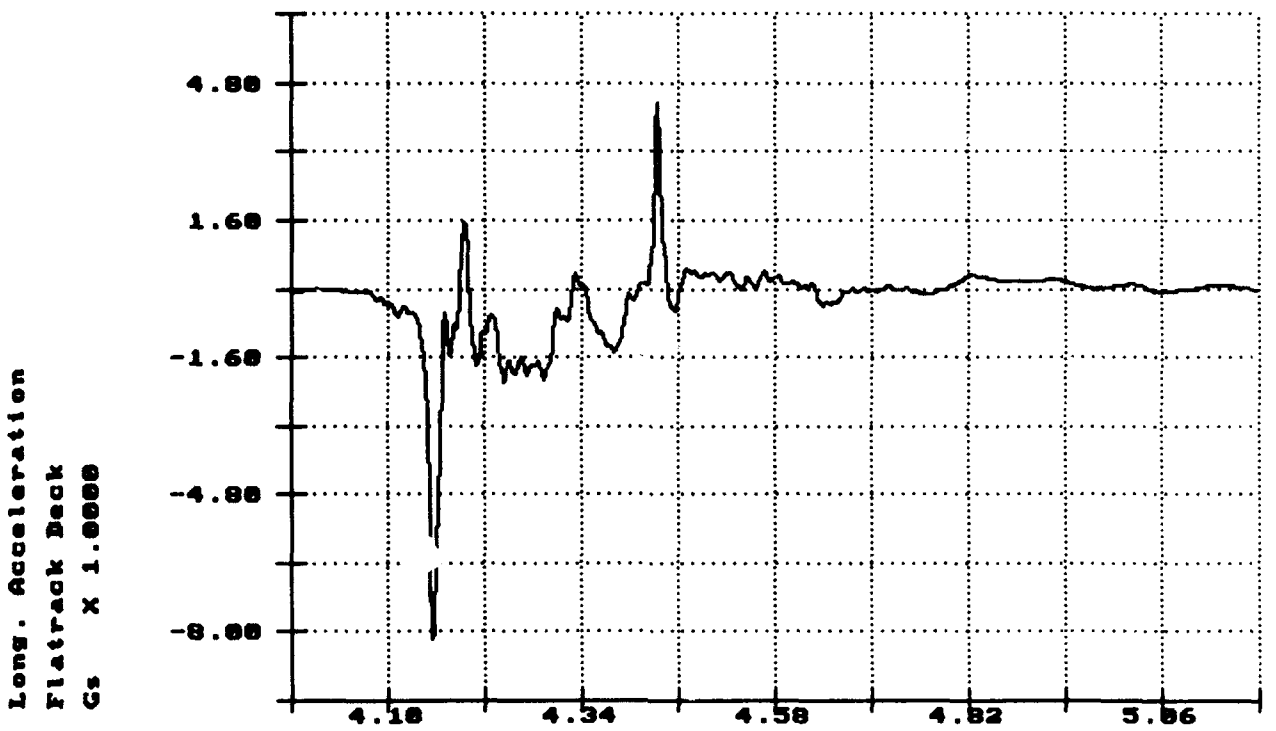
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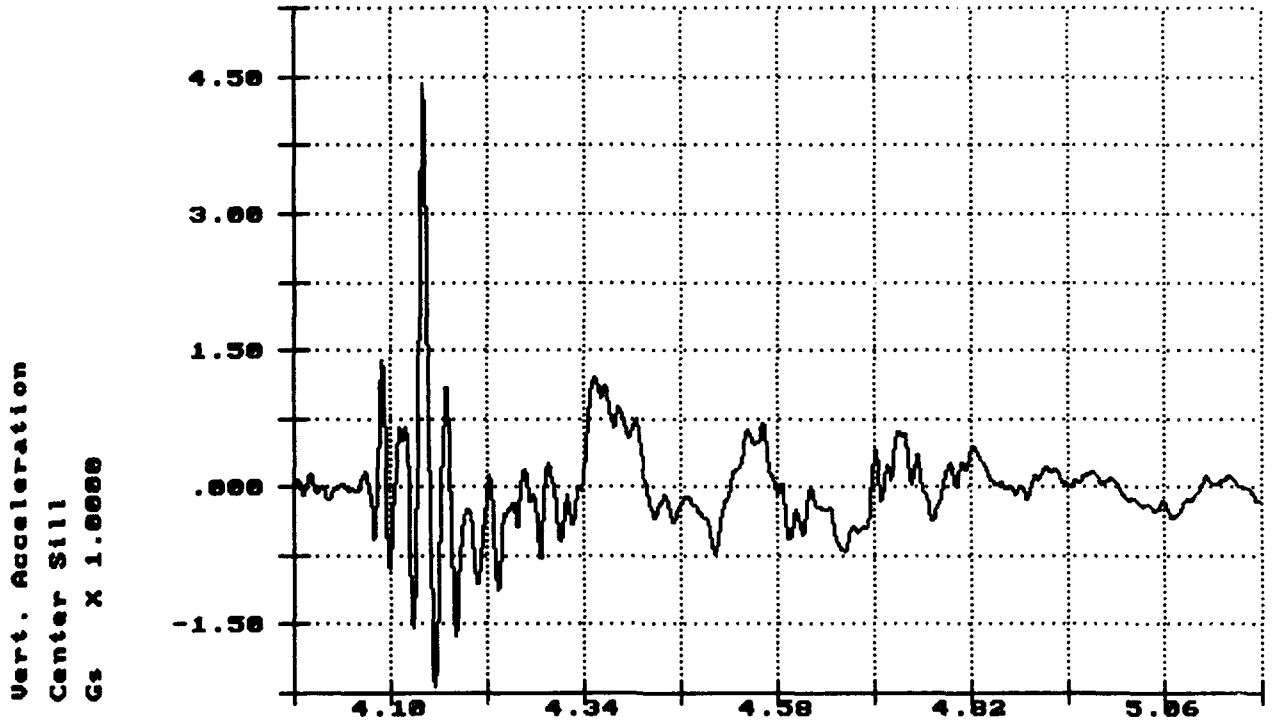
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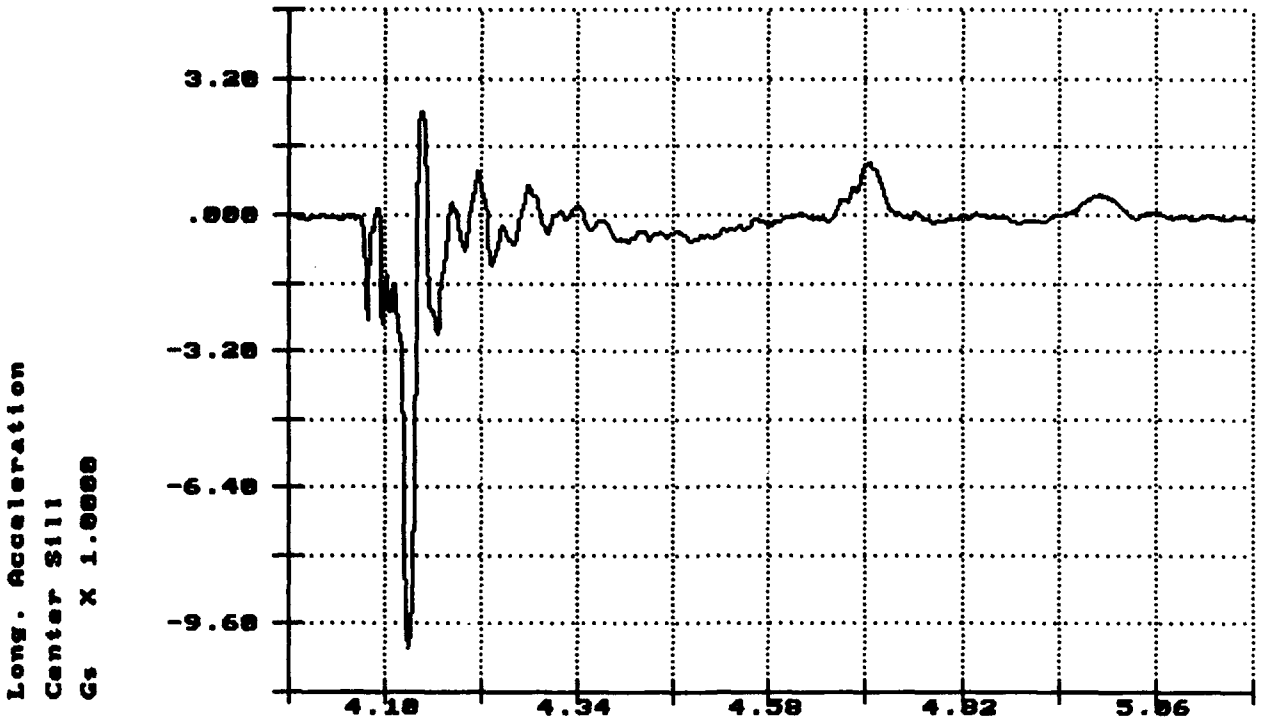
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R.I. of PLS Flatrack, Impact 5: 8.43MPH Nov 23 10:25:16 1993



R.I. of PLS Flatrack, Impact 5: 8.43MPH Nov 23 10:25:16 1993



TEST NO. 6

RAIL IMPACT DATA

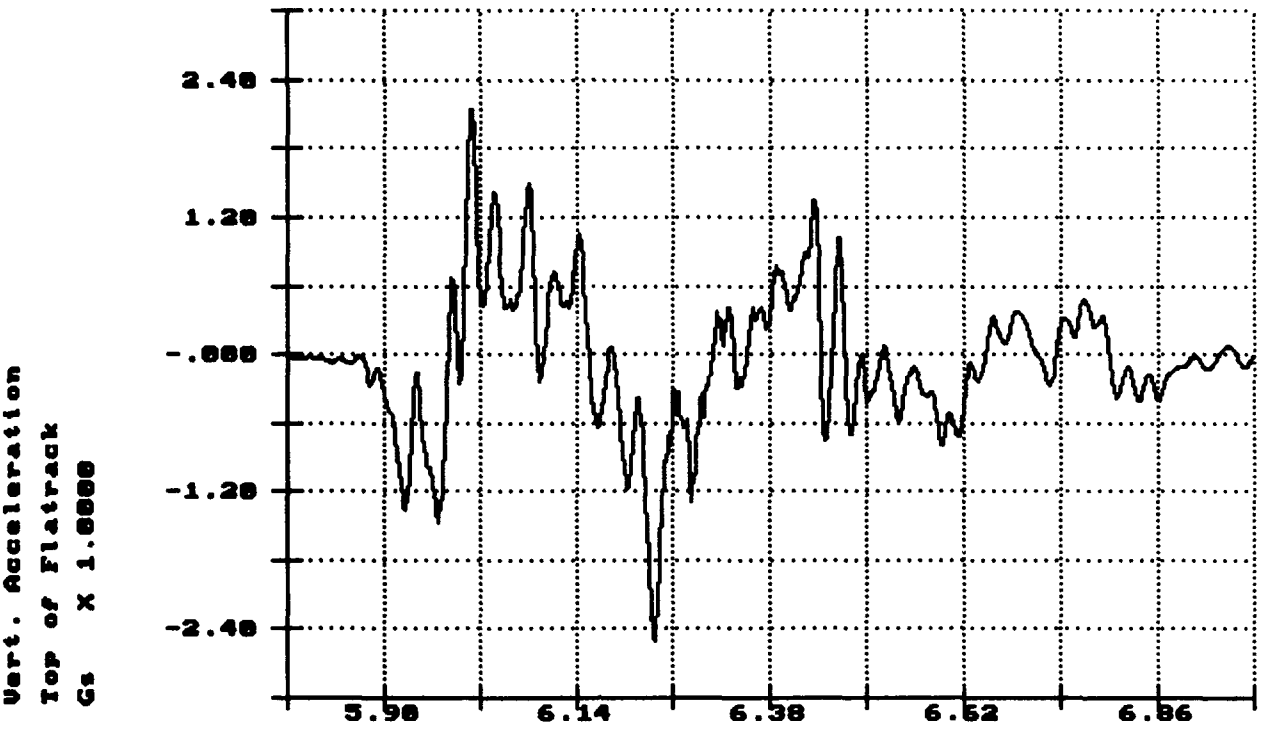
Test No.: 6 Date: 23 November 1993

Specimen Load: PLS trailer with an EPF loaded with 120MM tank ammunition on metal pallets.

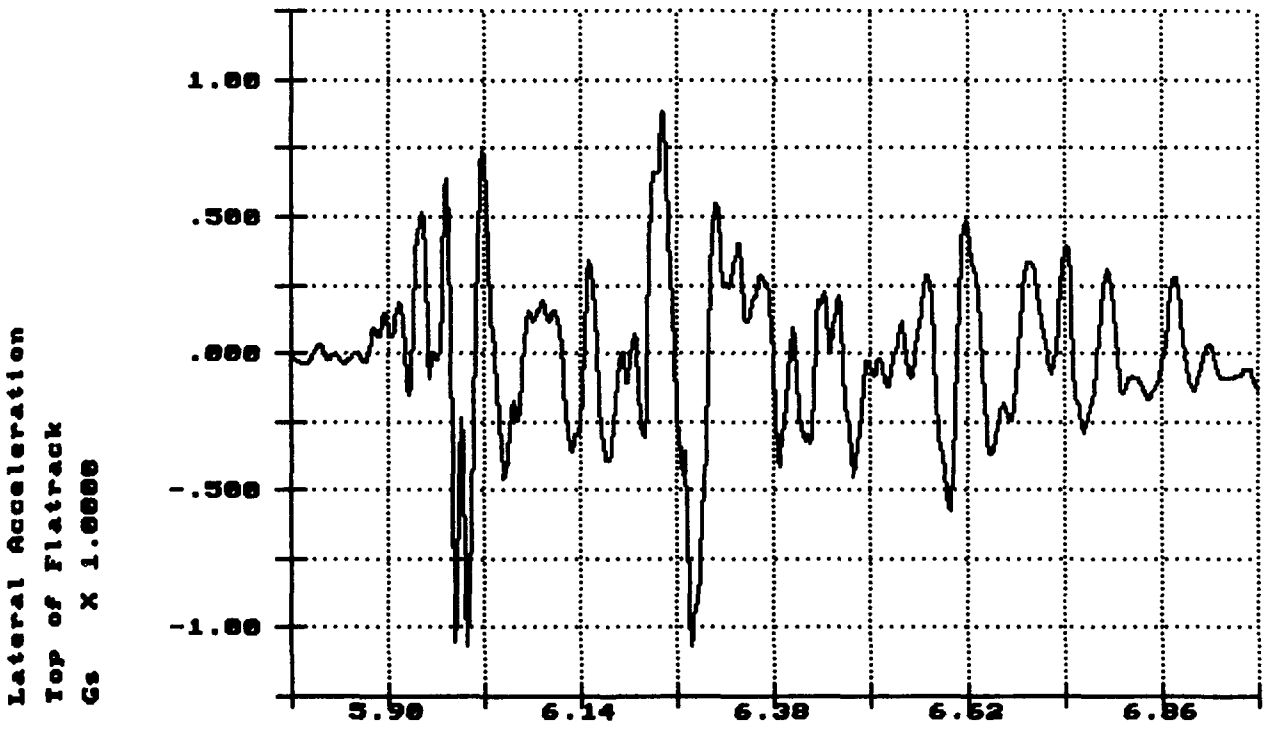
Flatcar No.: EJ&E 6099	Lt. Wt.: 56,200
PLS Trailer	Wt.: 13,240
EPF No. 2	Wt.: 7,500
Lading, 120MM Tank Ammunition on Metal Pallets	Wt.: 24,000
	Total Specimen Wt.: 100,940
	Buffer Car (five cars) Wt: 250,000

Impact	End Struck	Velocity	Remarks
1	Forward	5.68	1-1/2-inch gap at pallet tops at rear and at center gate.
2	Forward	6.36	1/2-inch gap at rear of EPF and 1-inch gap at front and back of center gate.
3	Forward	8.62	1-1/2-inch gap at end wall of EPF. No trailer movement.
4	Rear	8.52	1-1/2-inch gap at rear end wall (complete load shifted to opposite end of EPF).

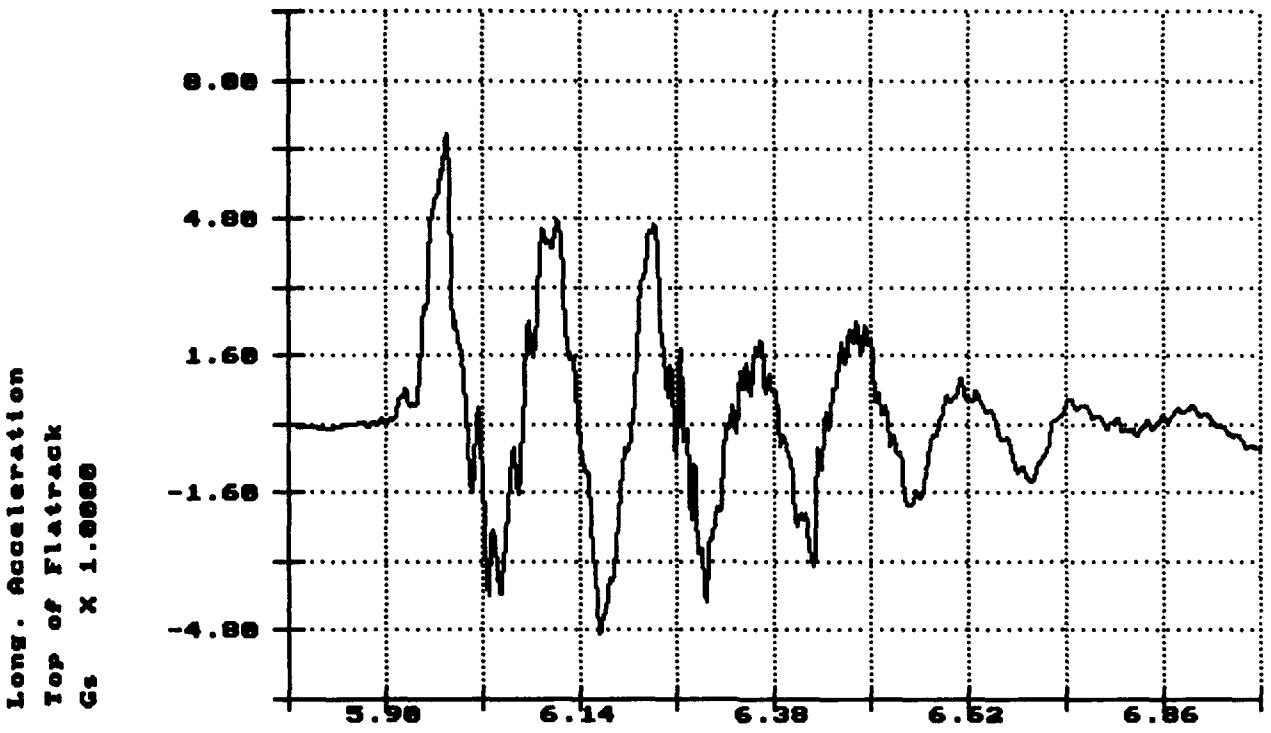
R.I. of PLS Flatrack, Impact 1: 5.68MPH Nov 23 13:38:58 1993



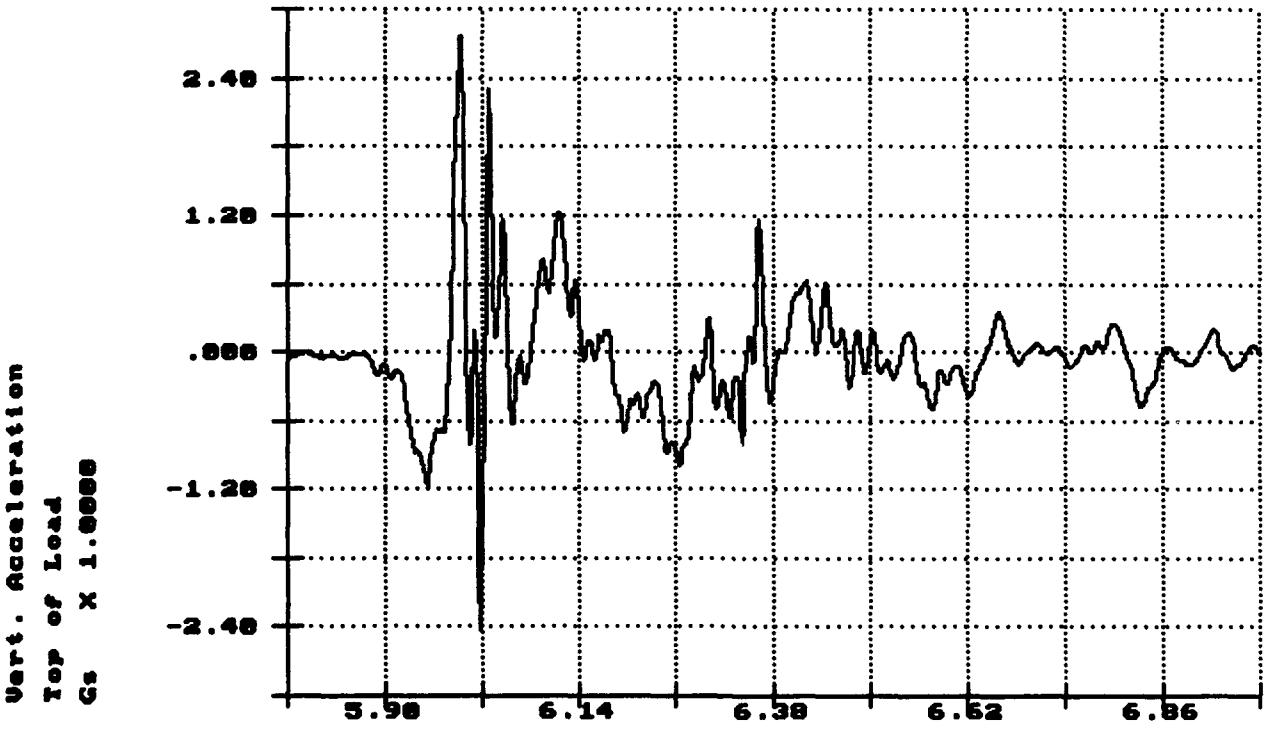
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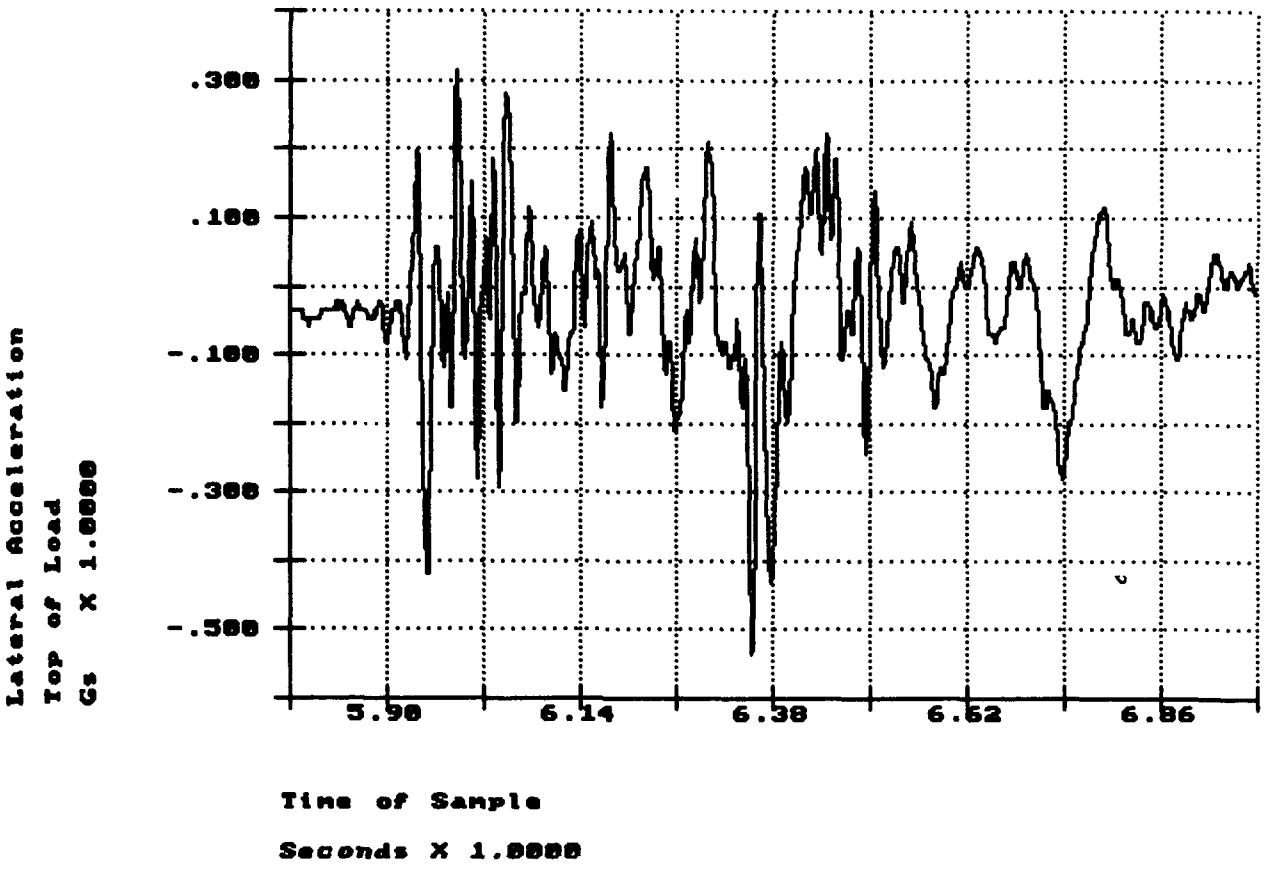
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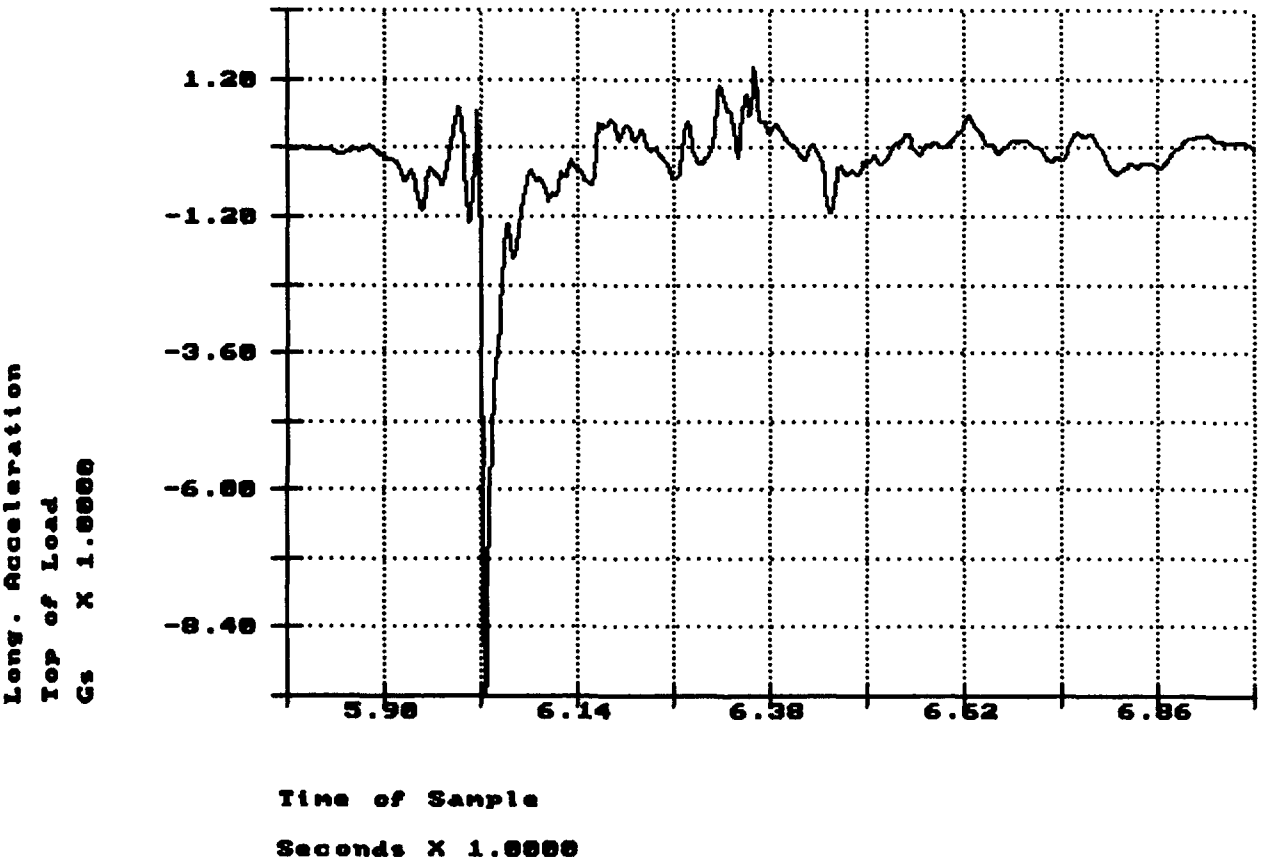
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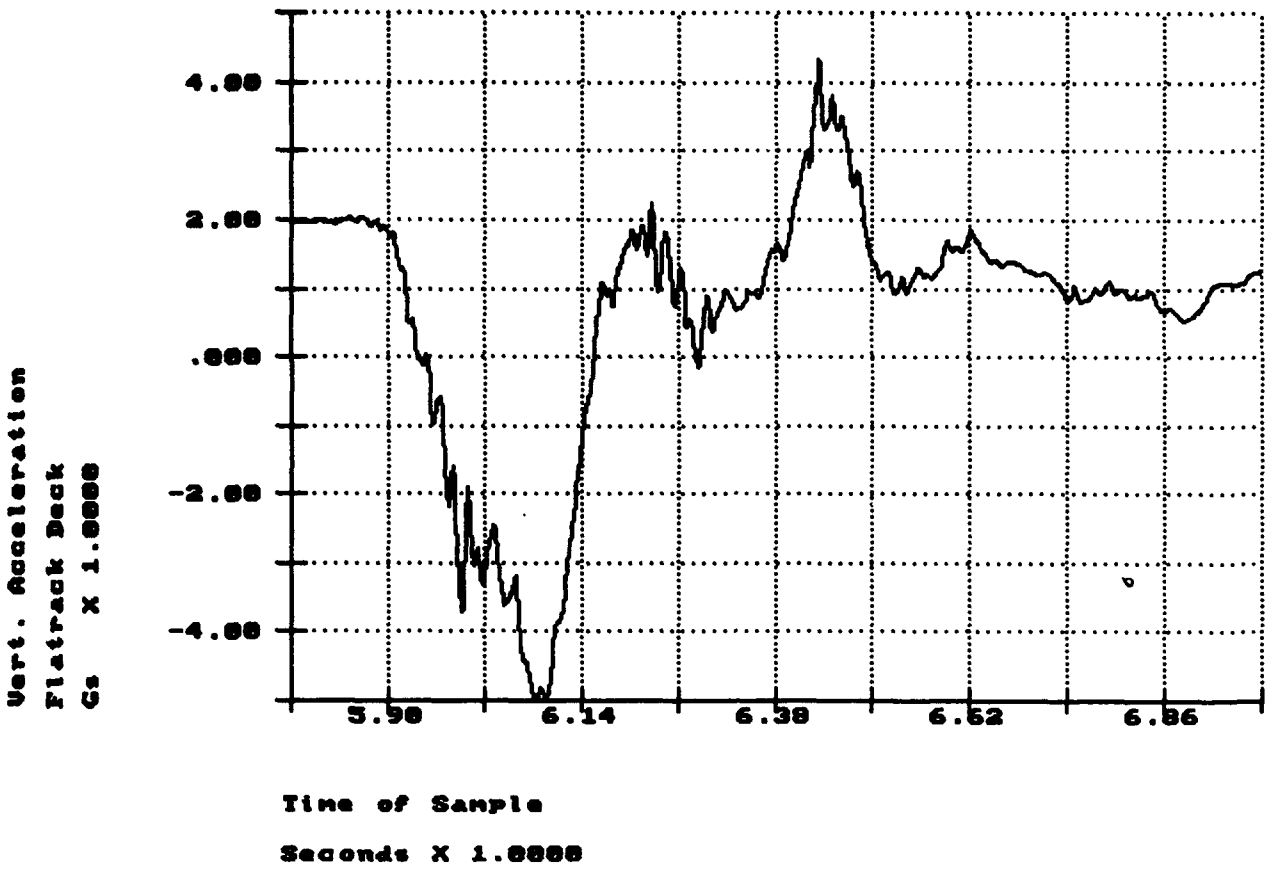
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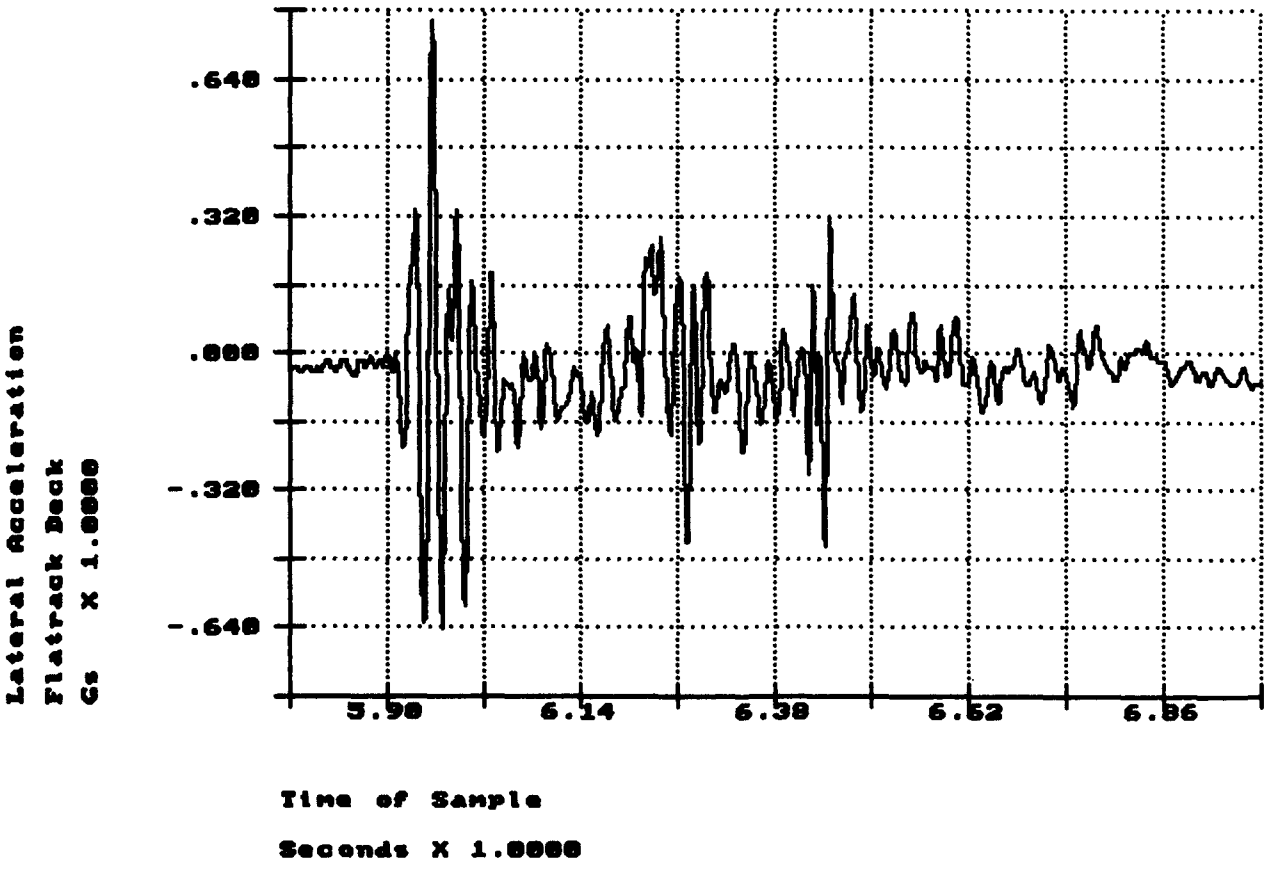
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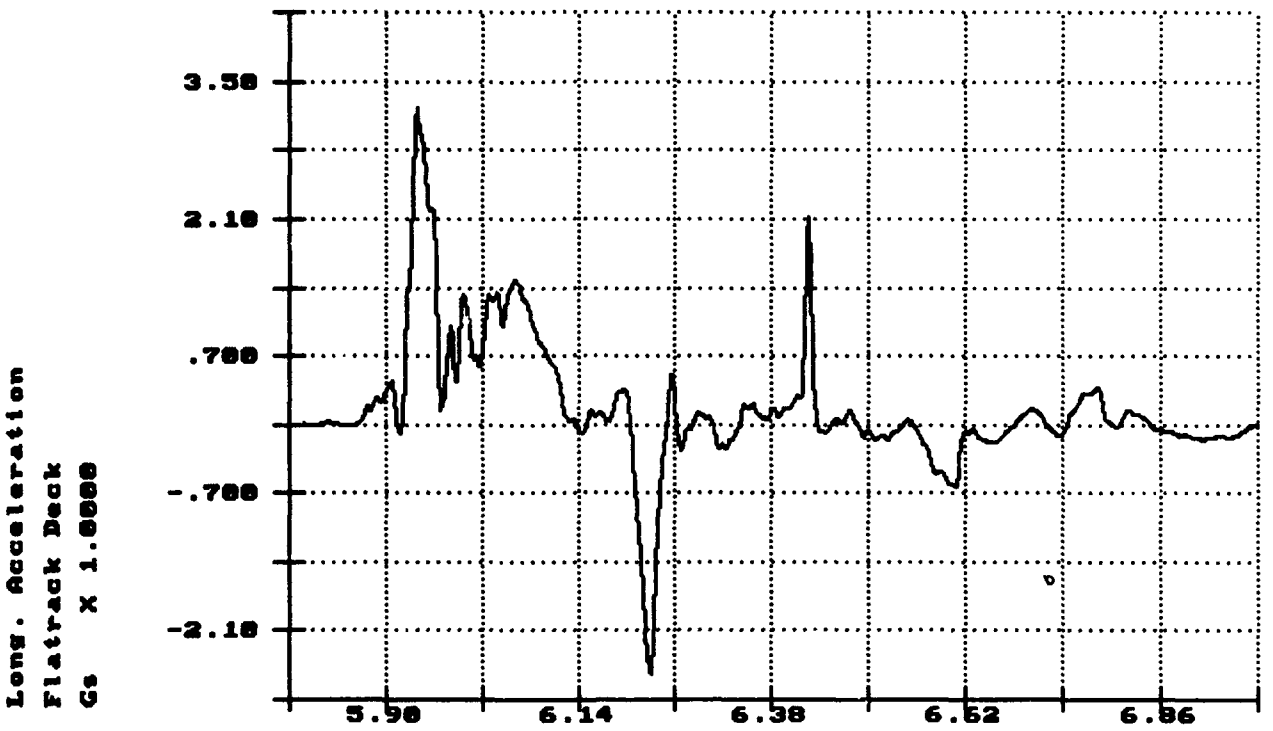
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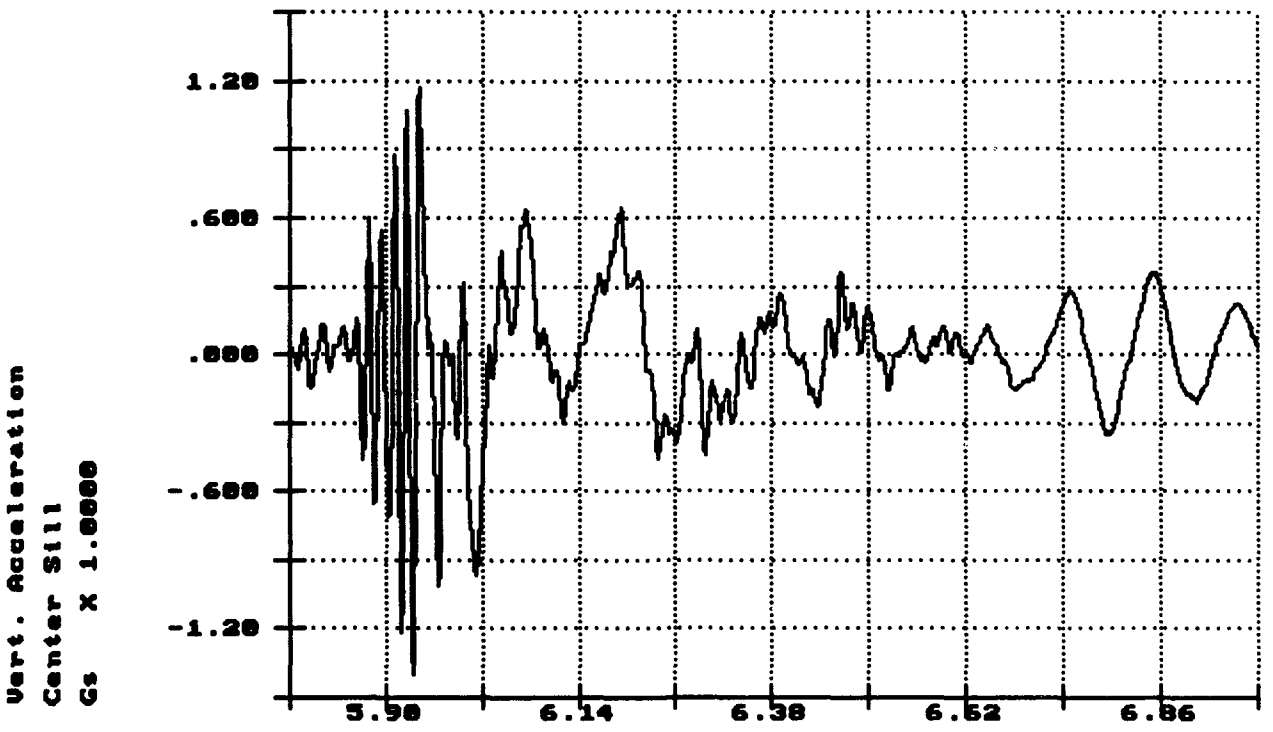
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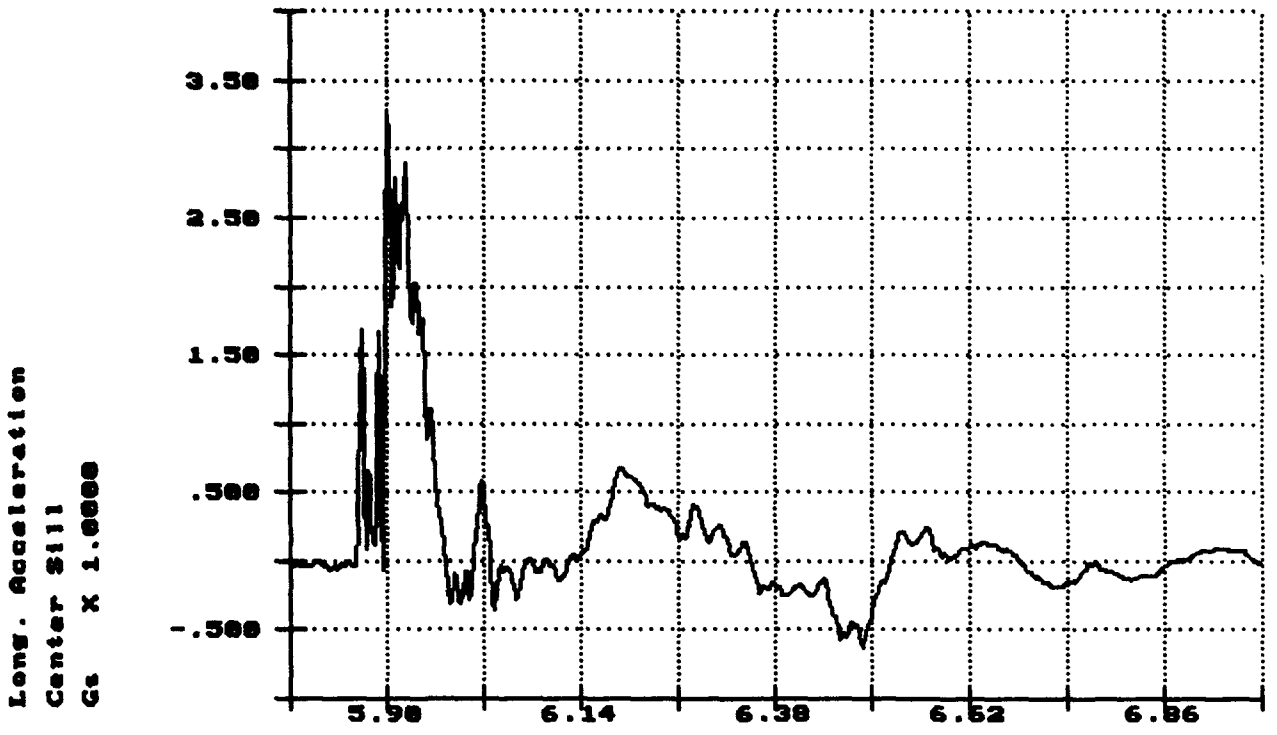
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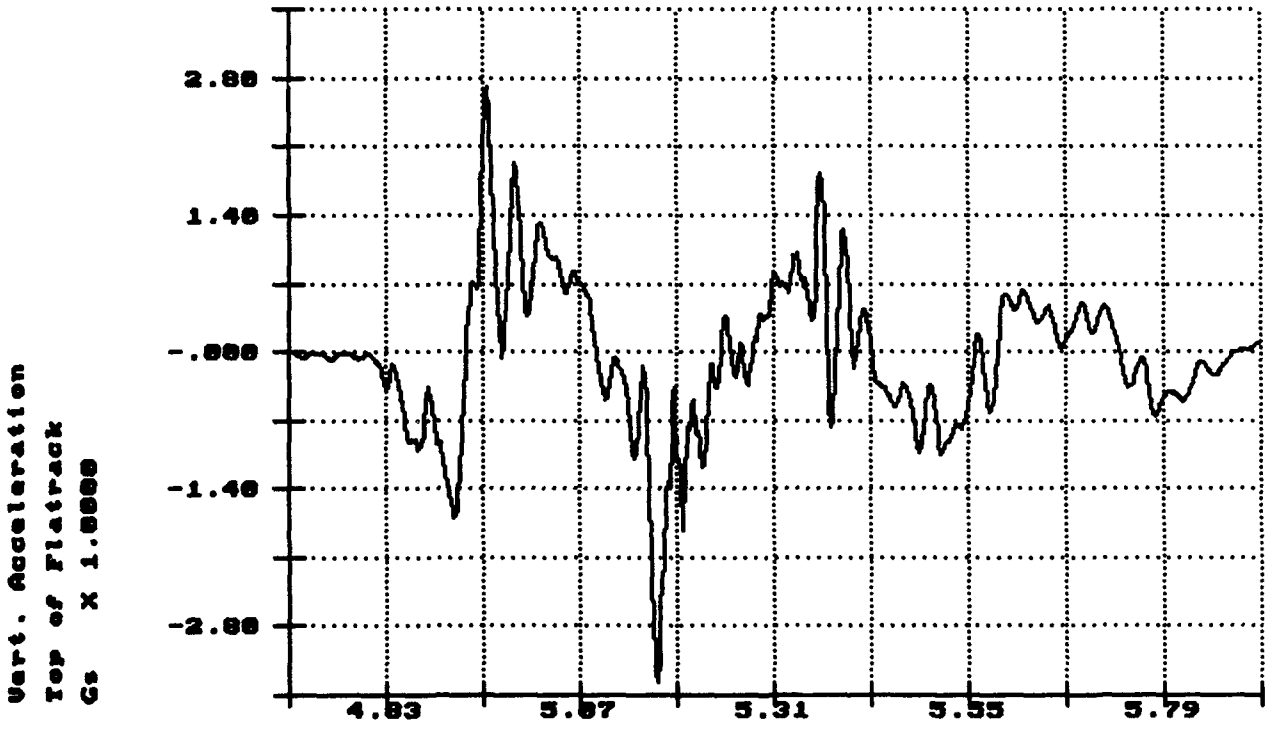
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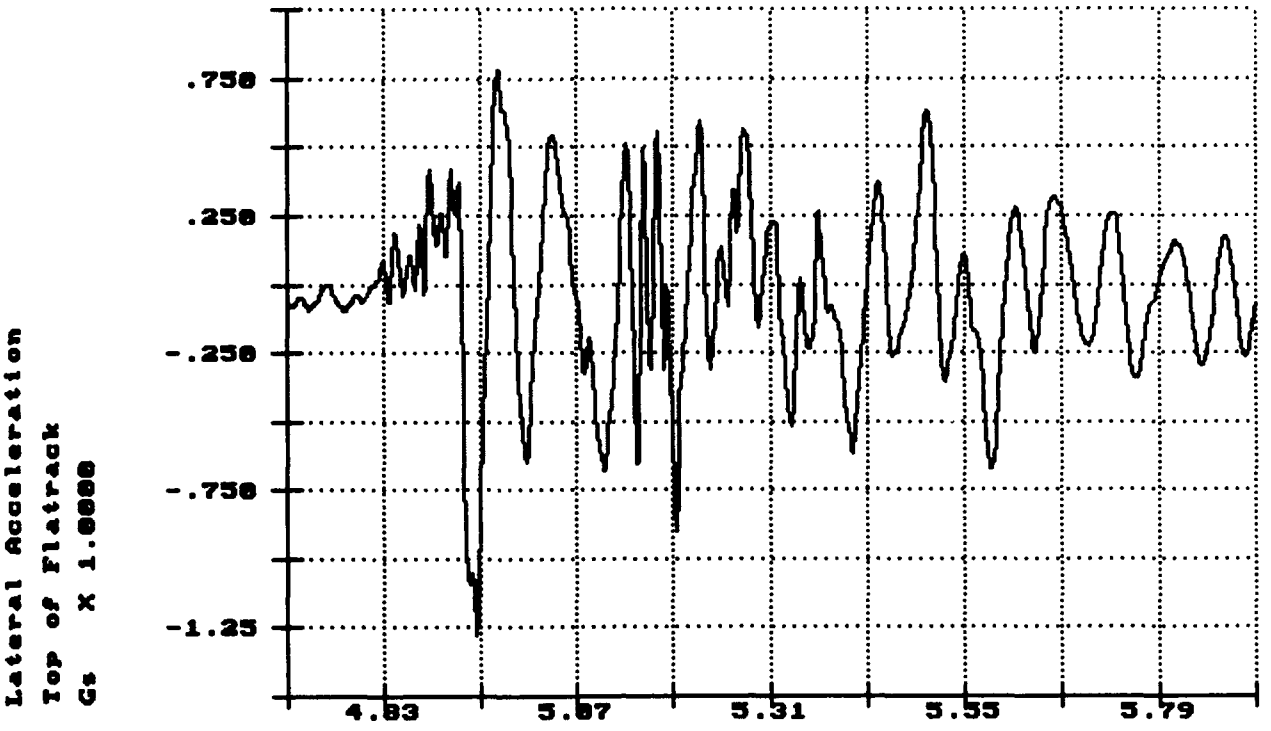
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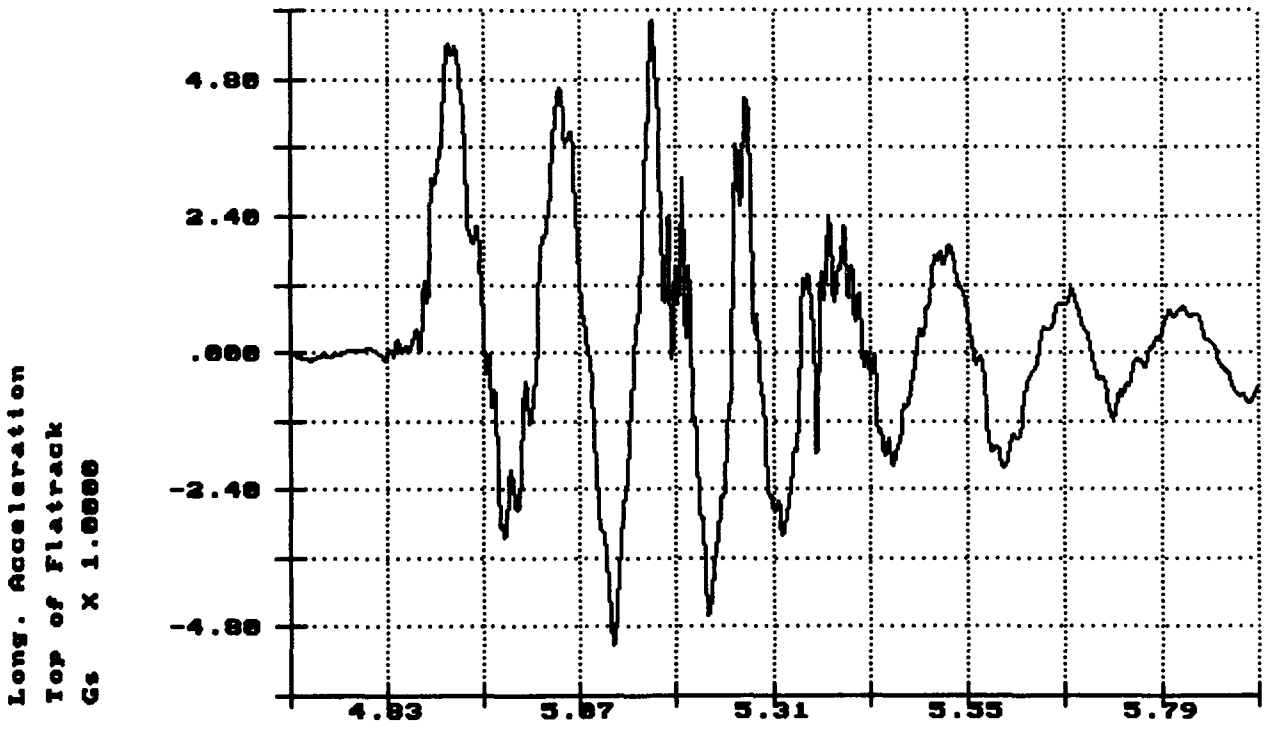
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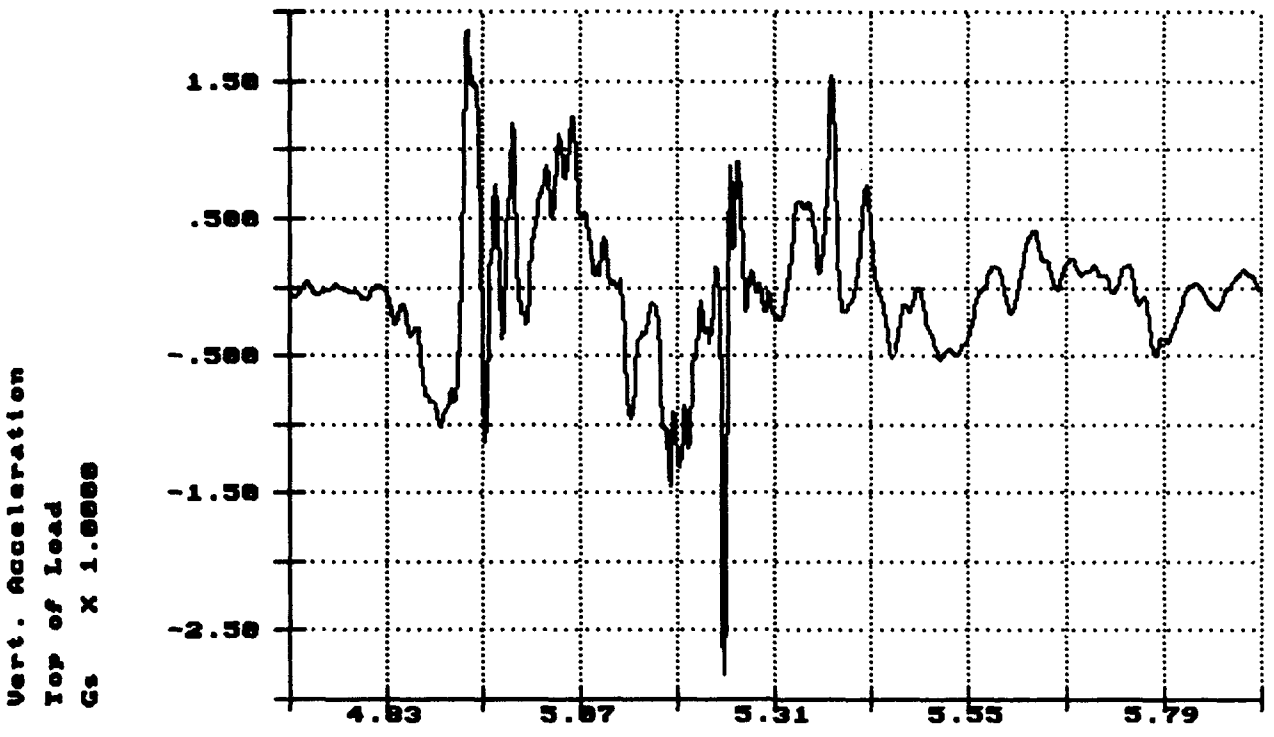
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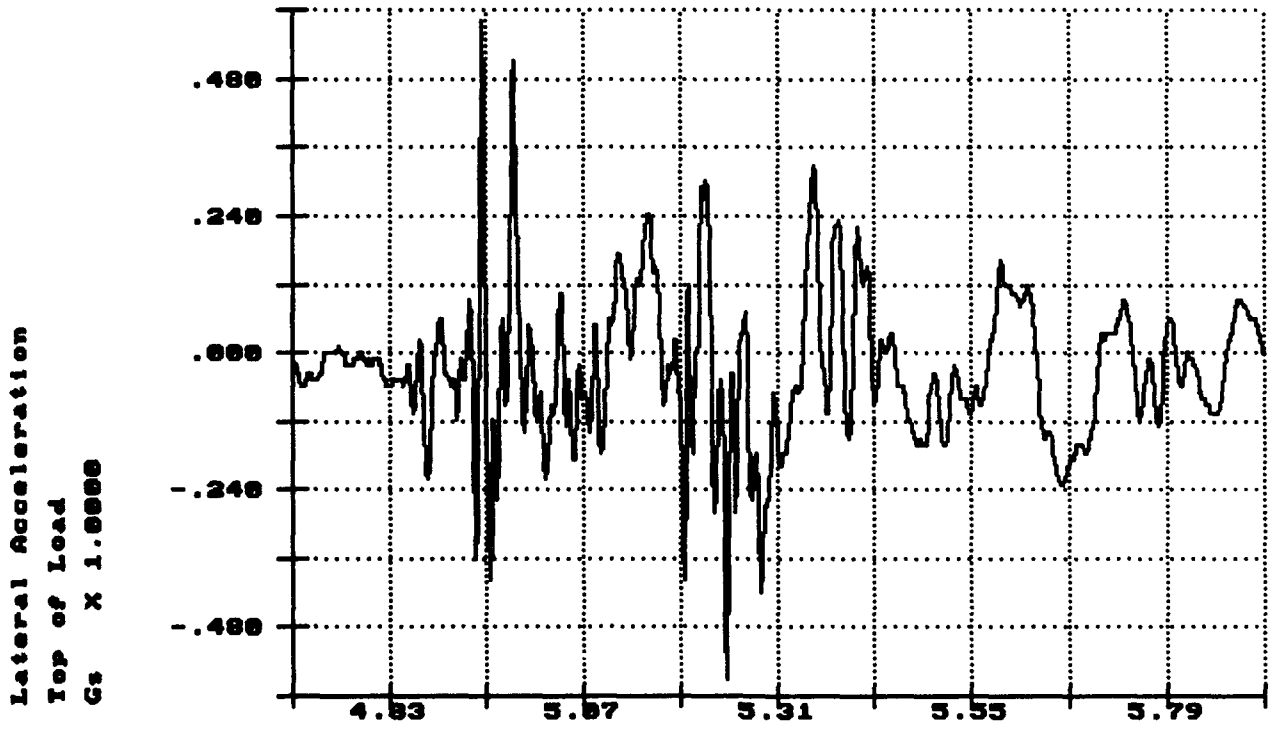
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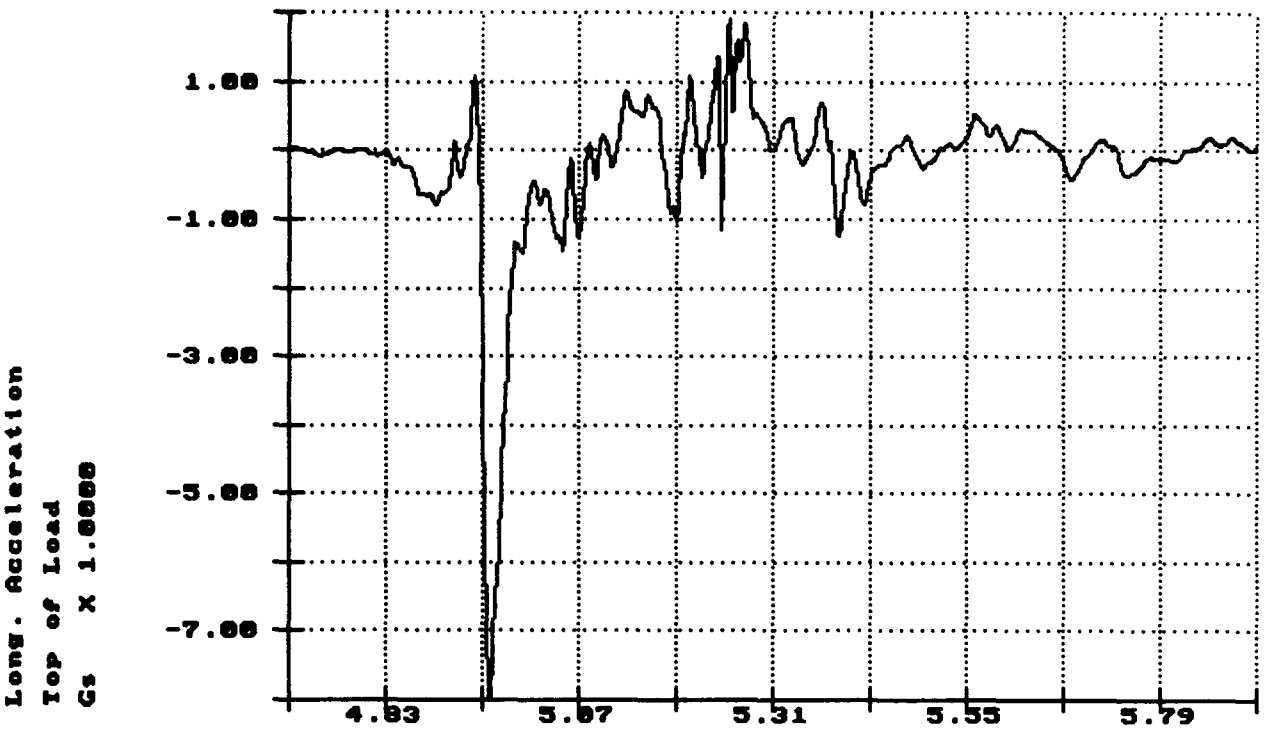
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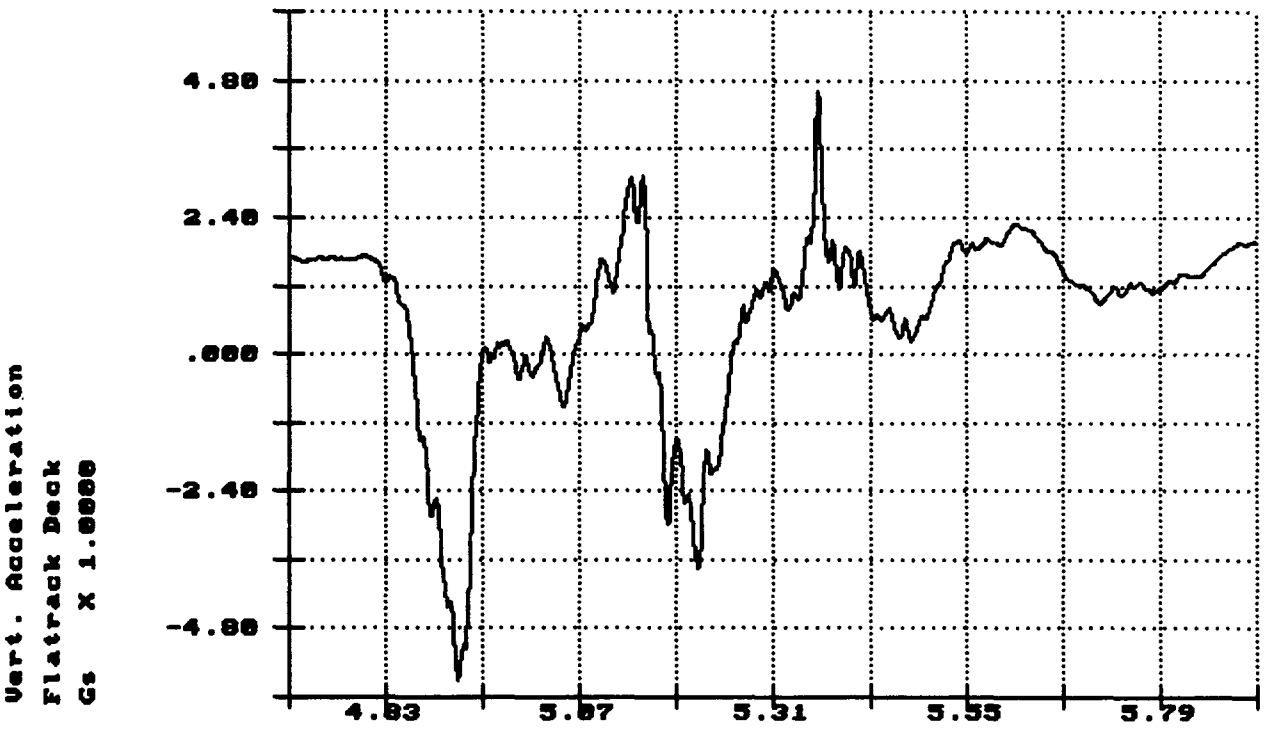
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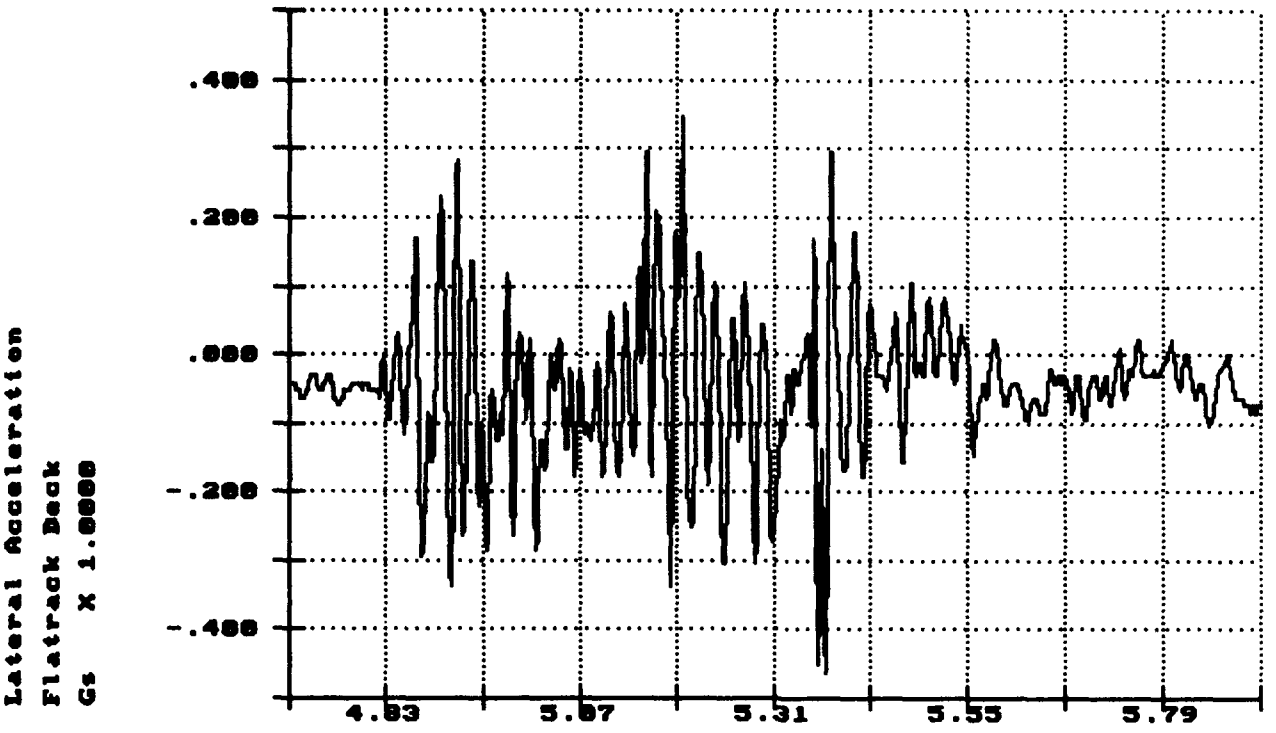
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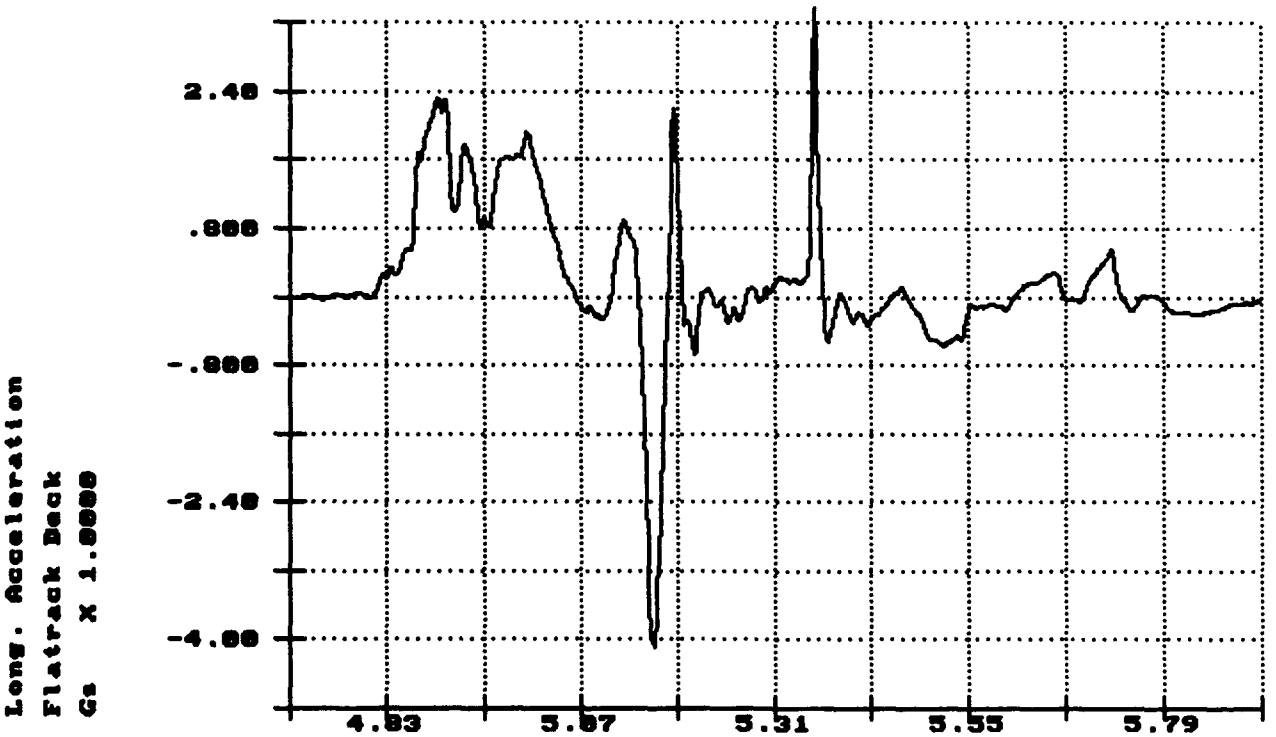
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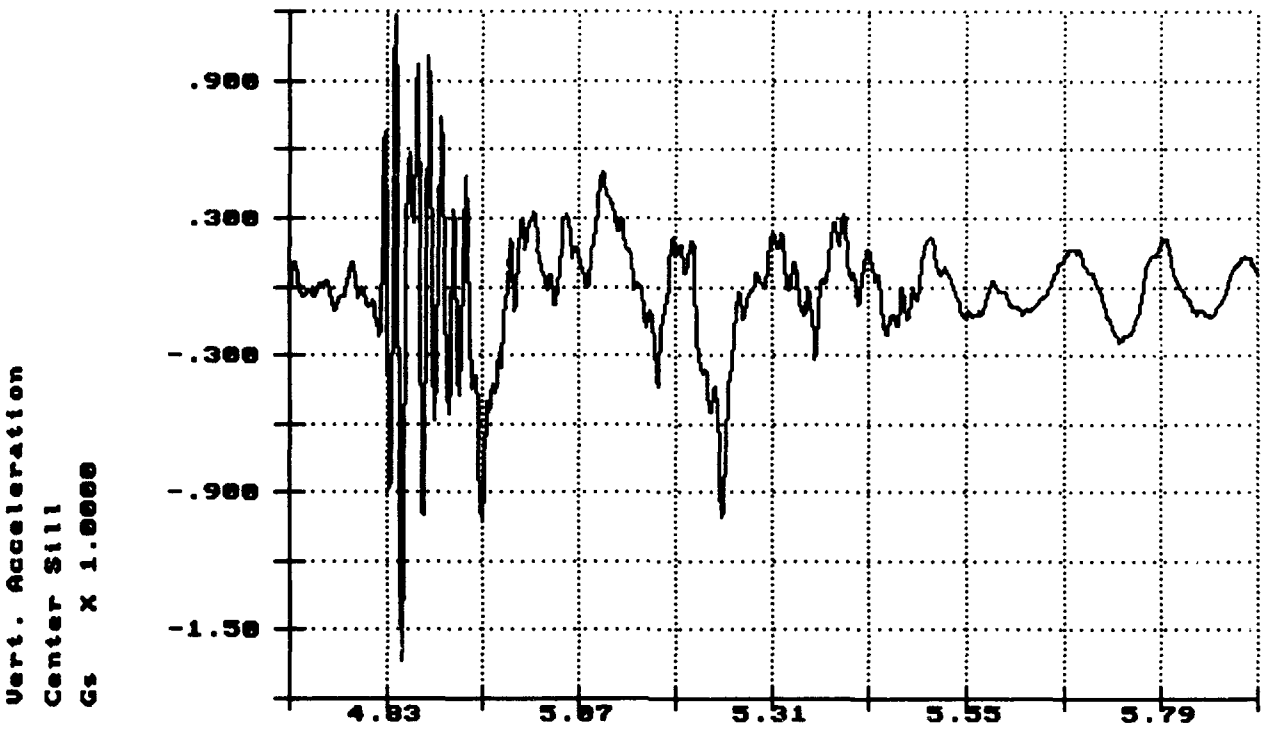
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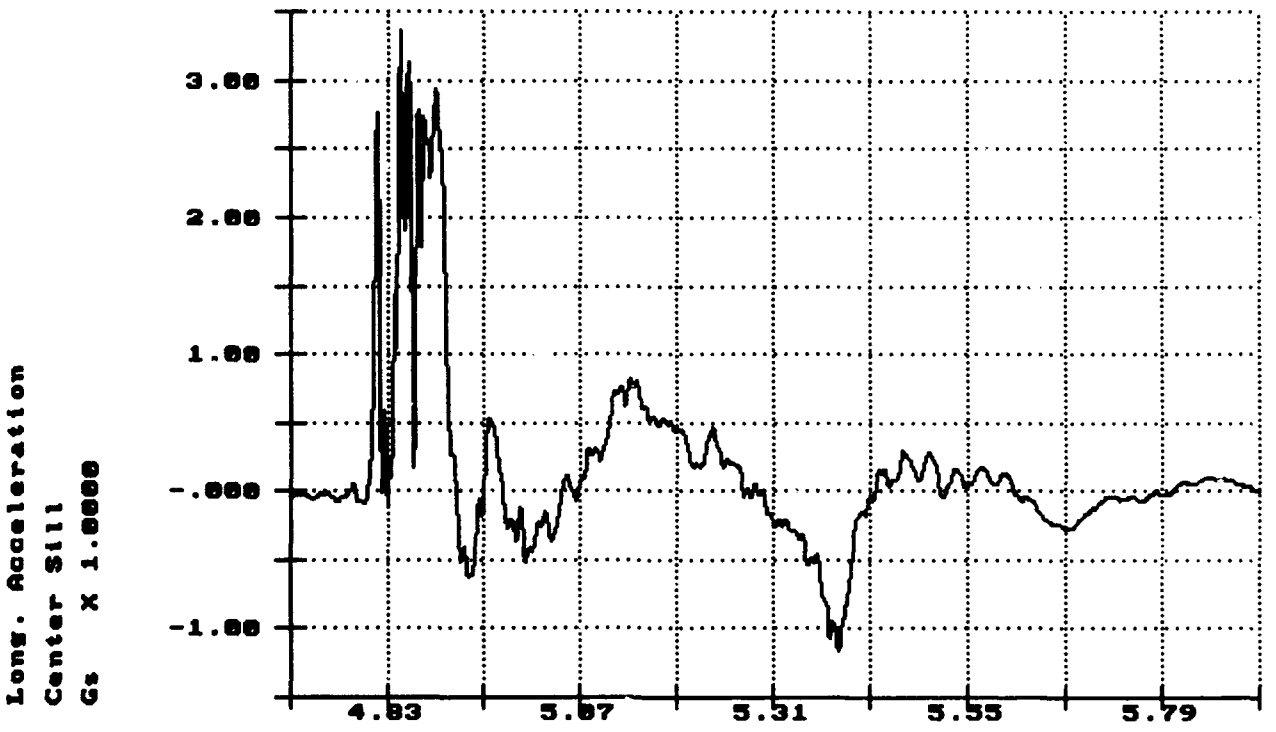
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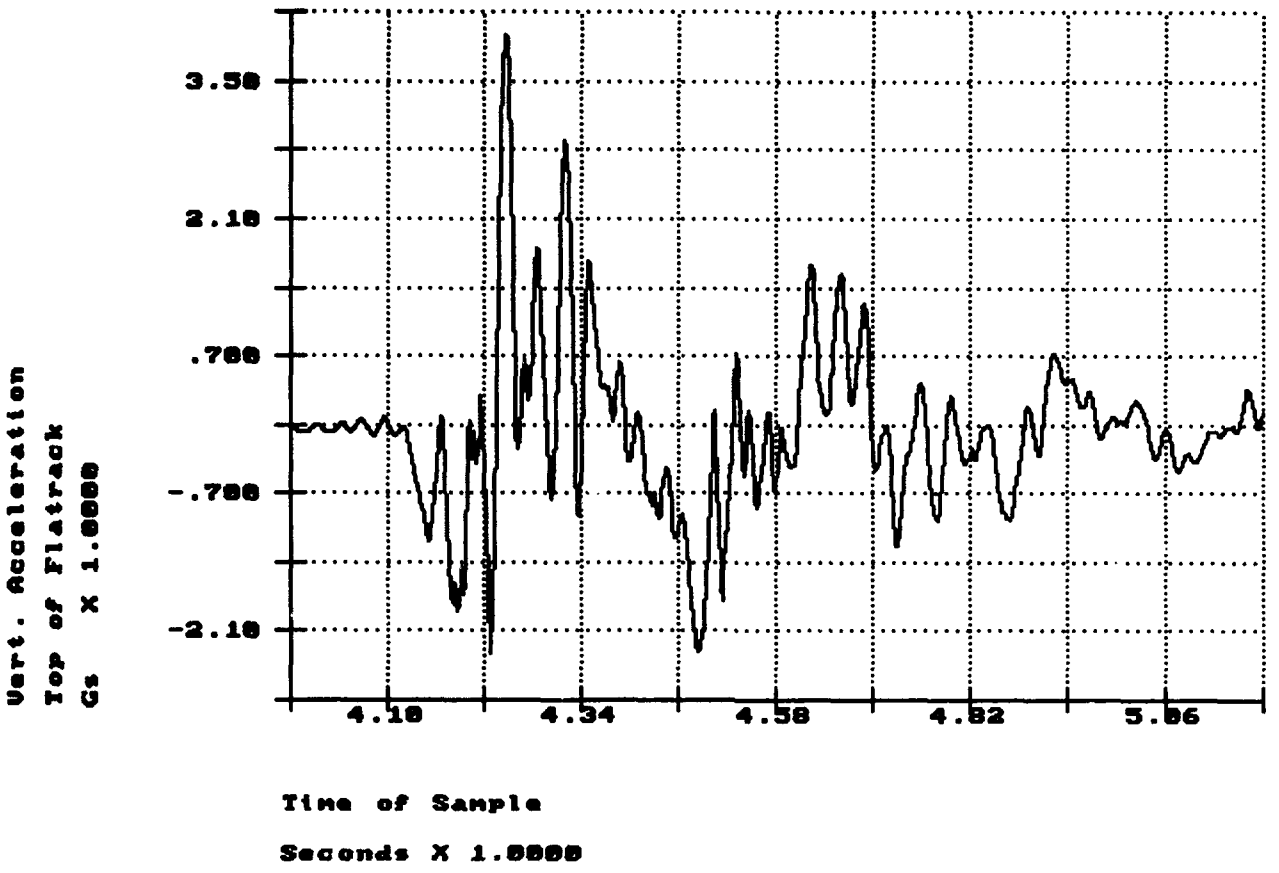
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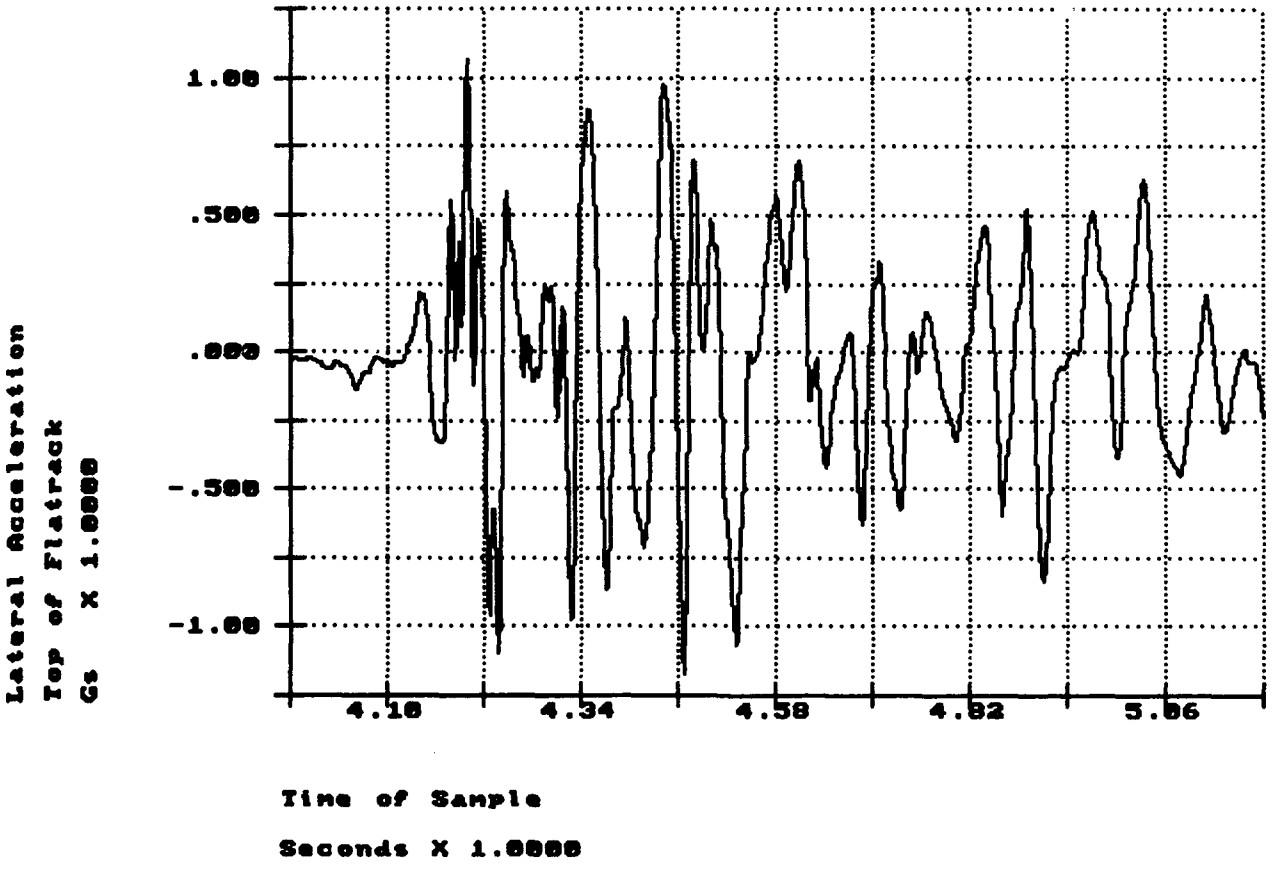
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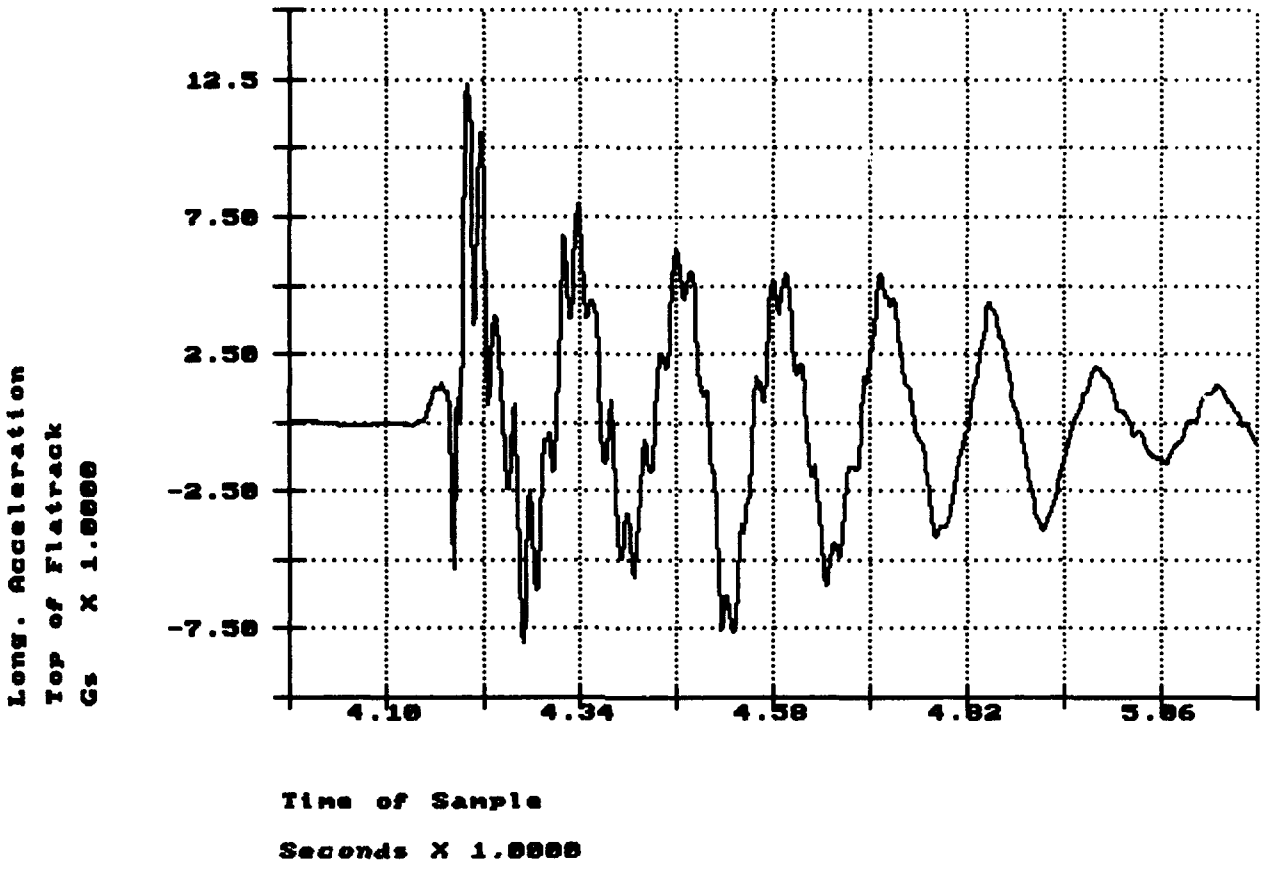
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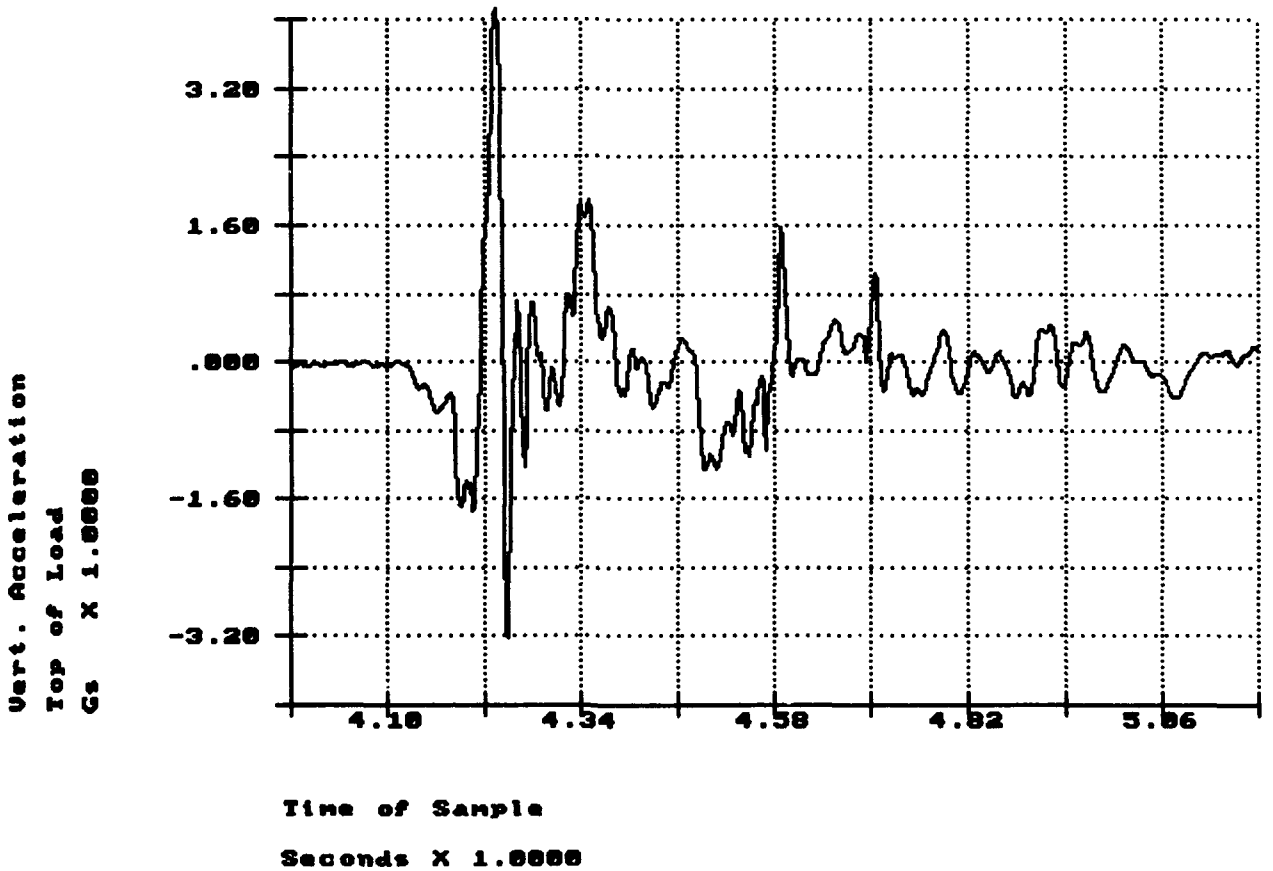
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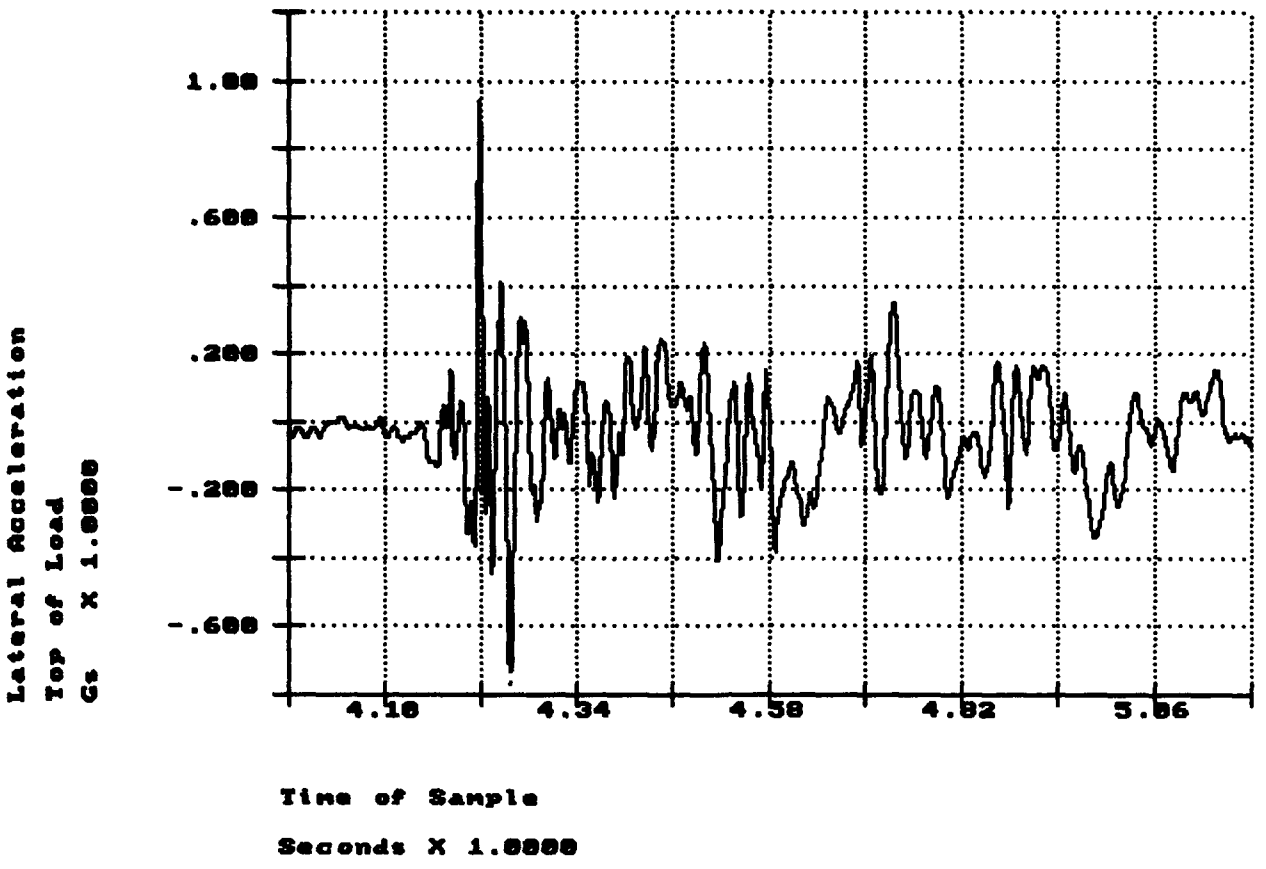
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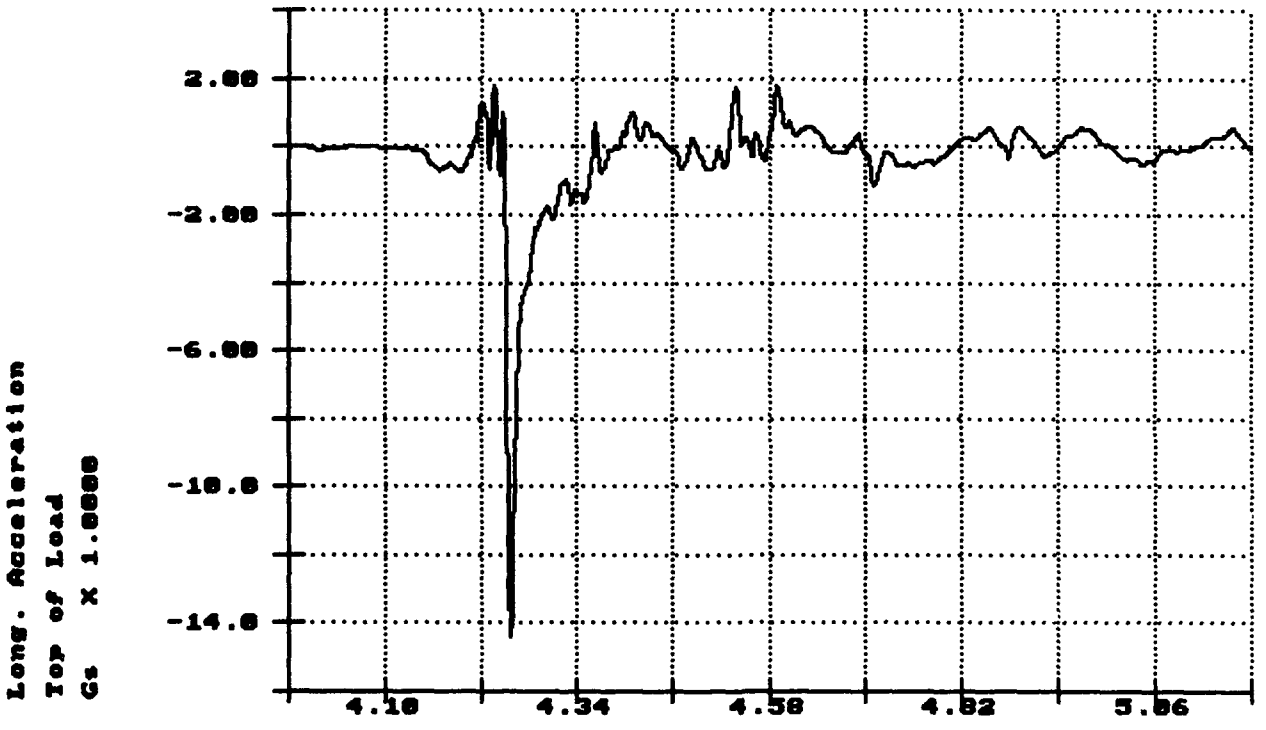
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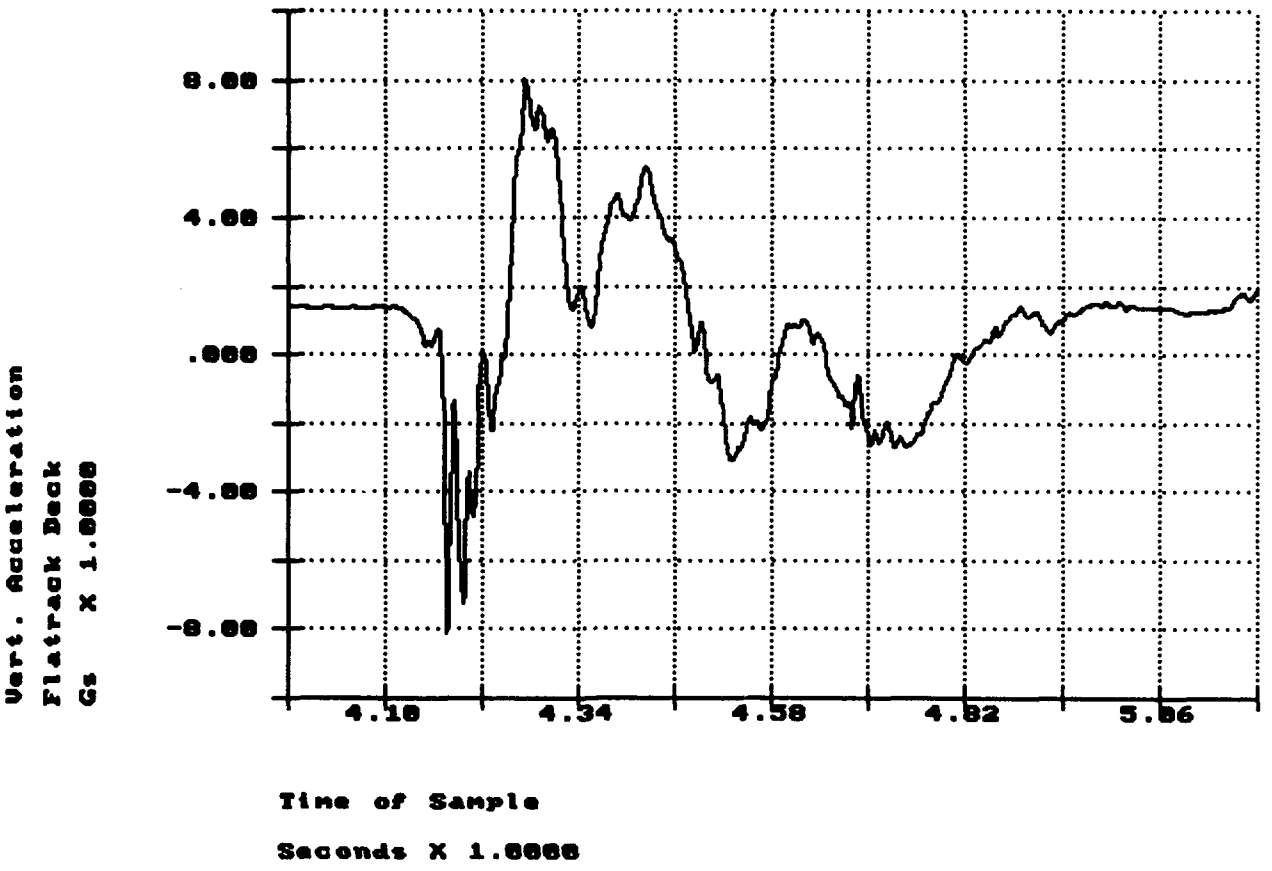
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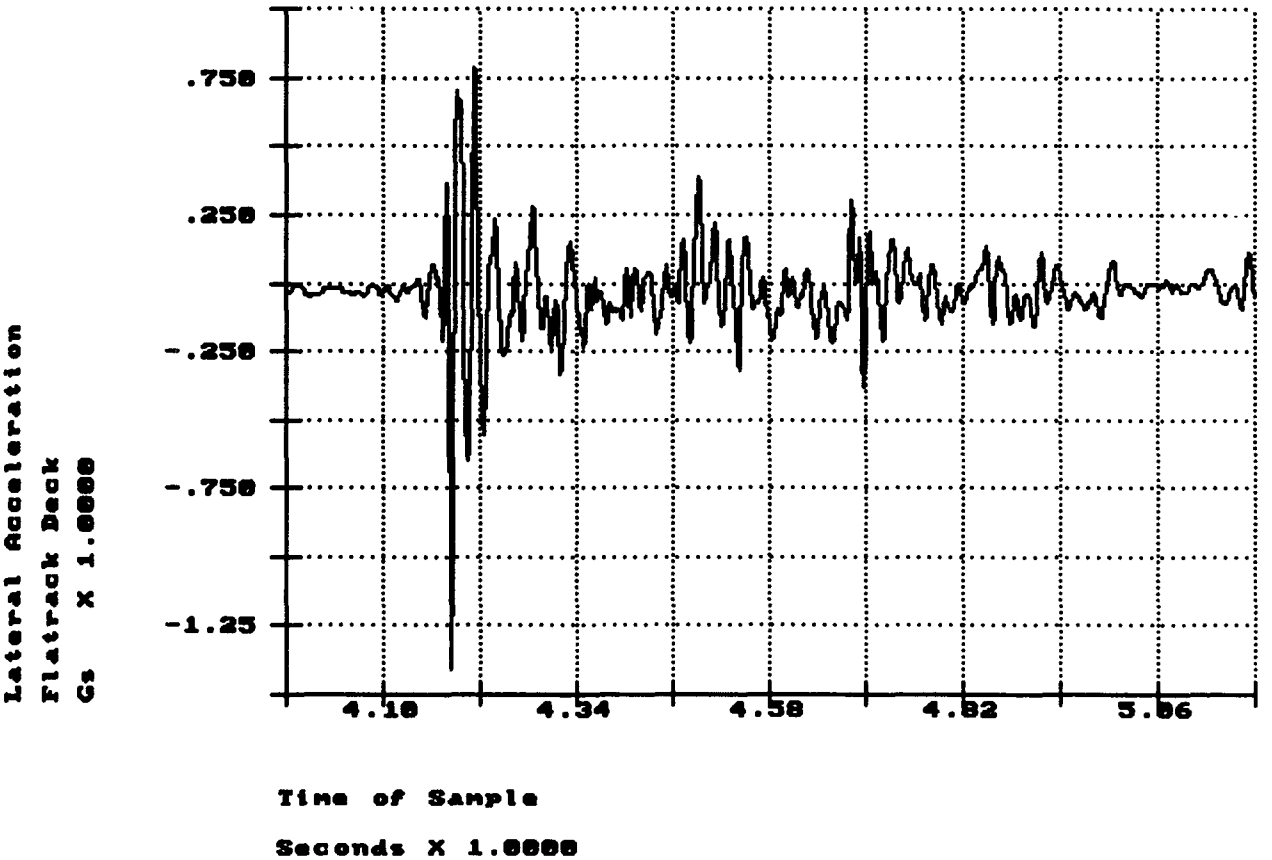
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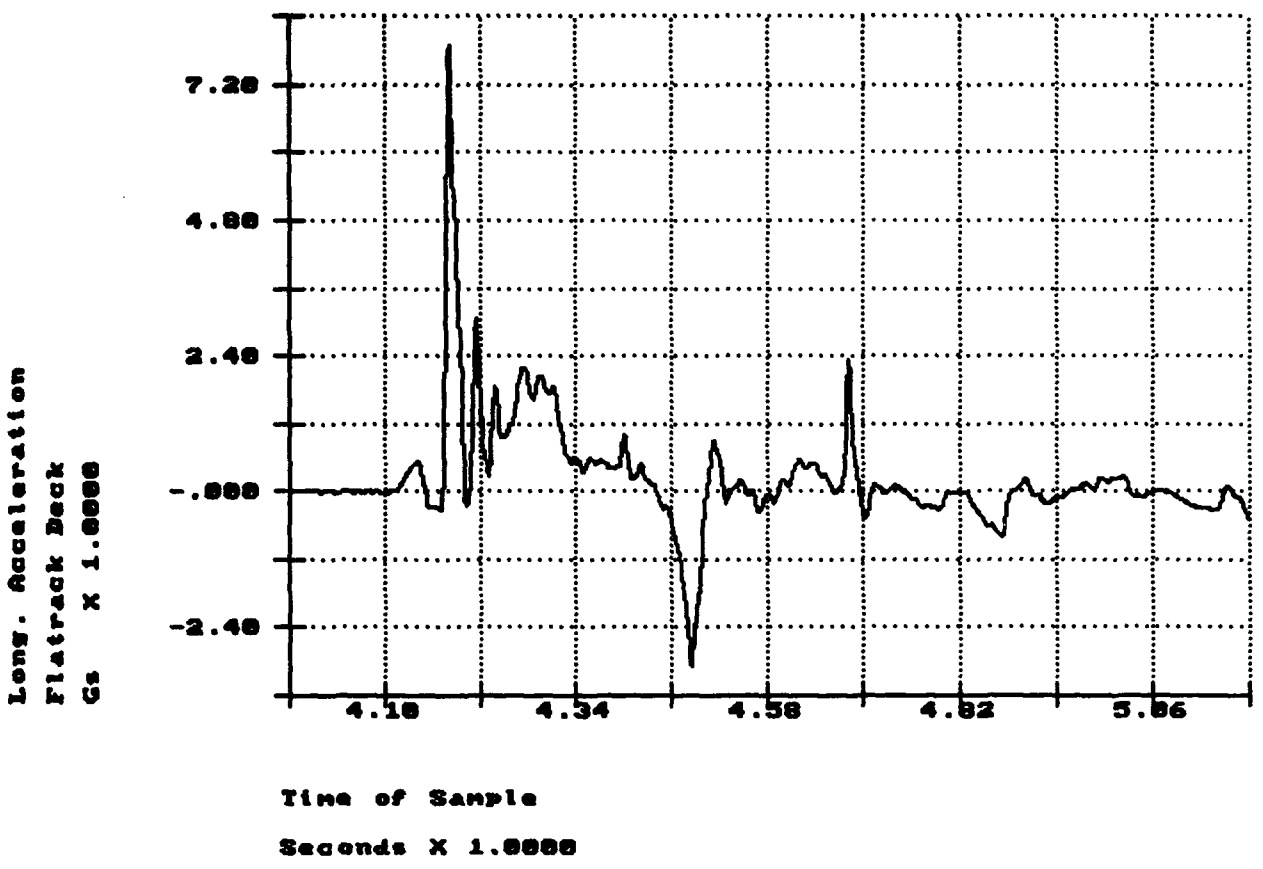
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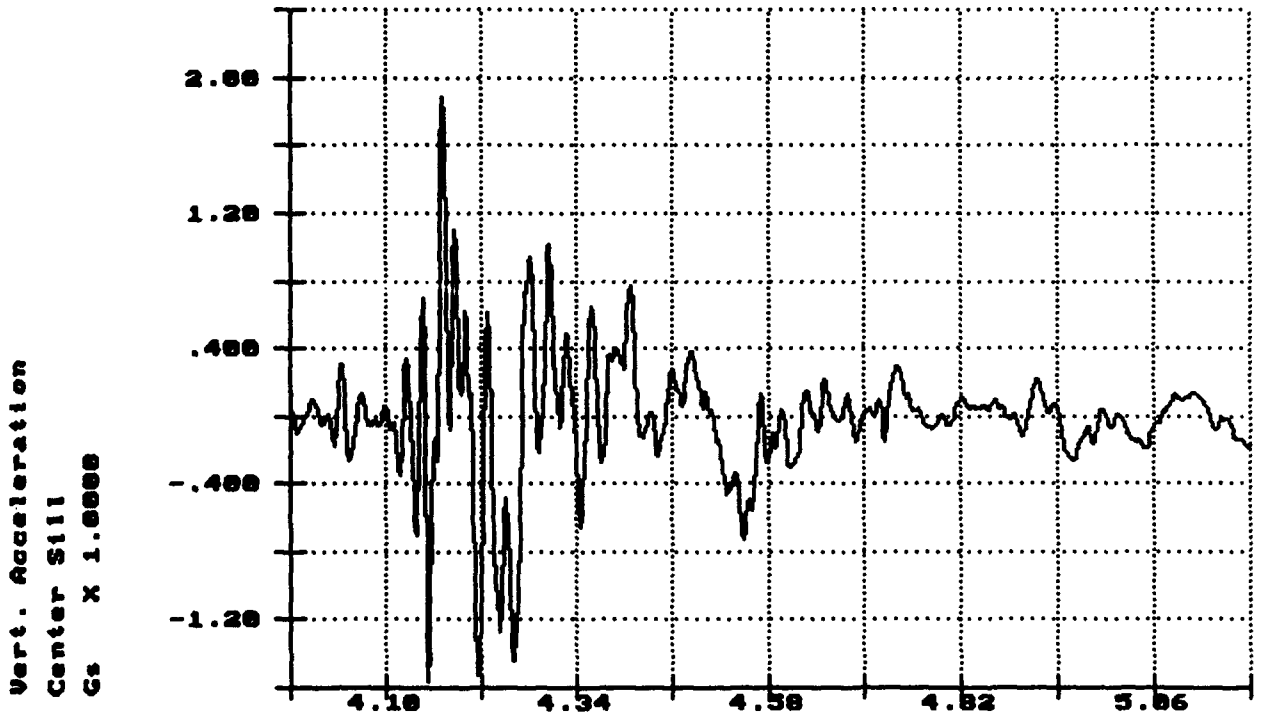
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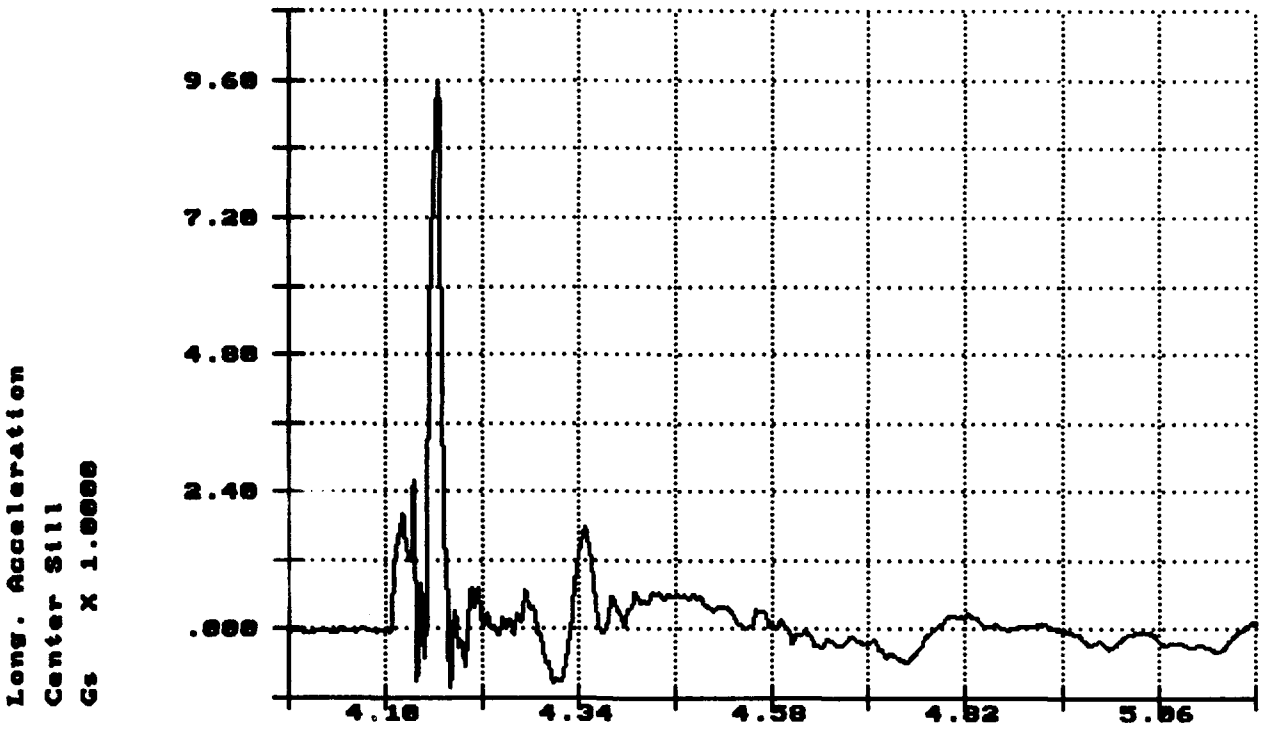
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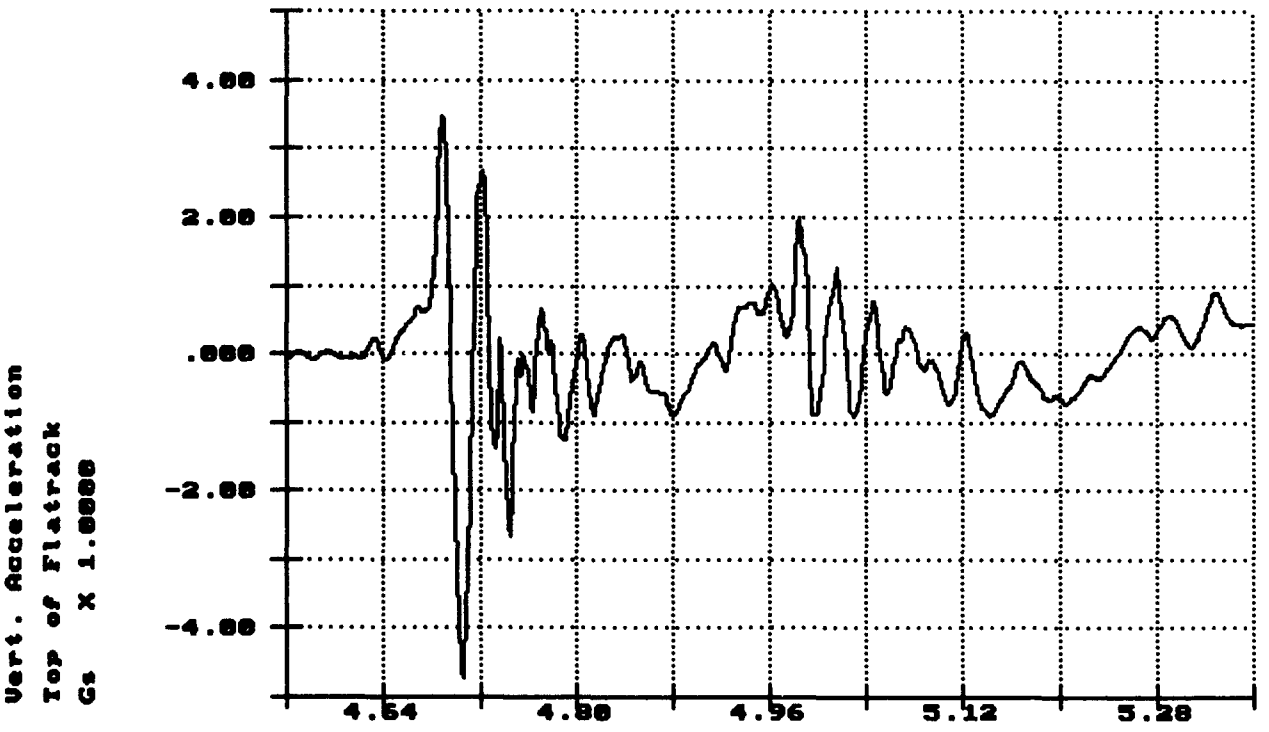
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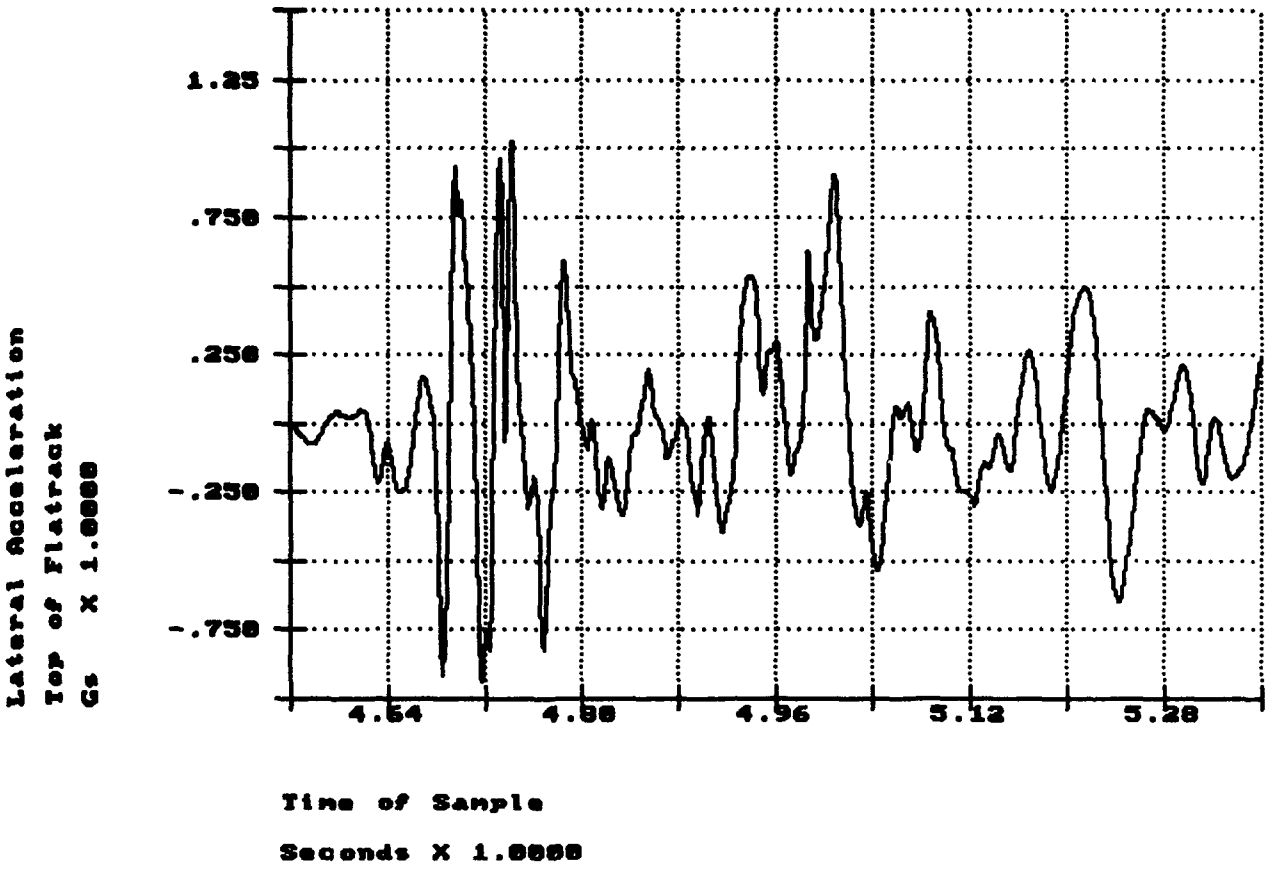
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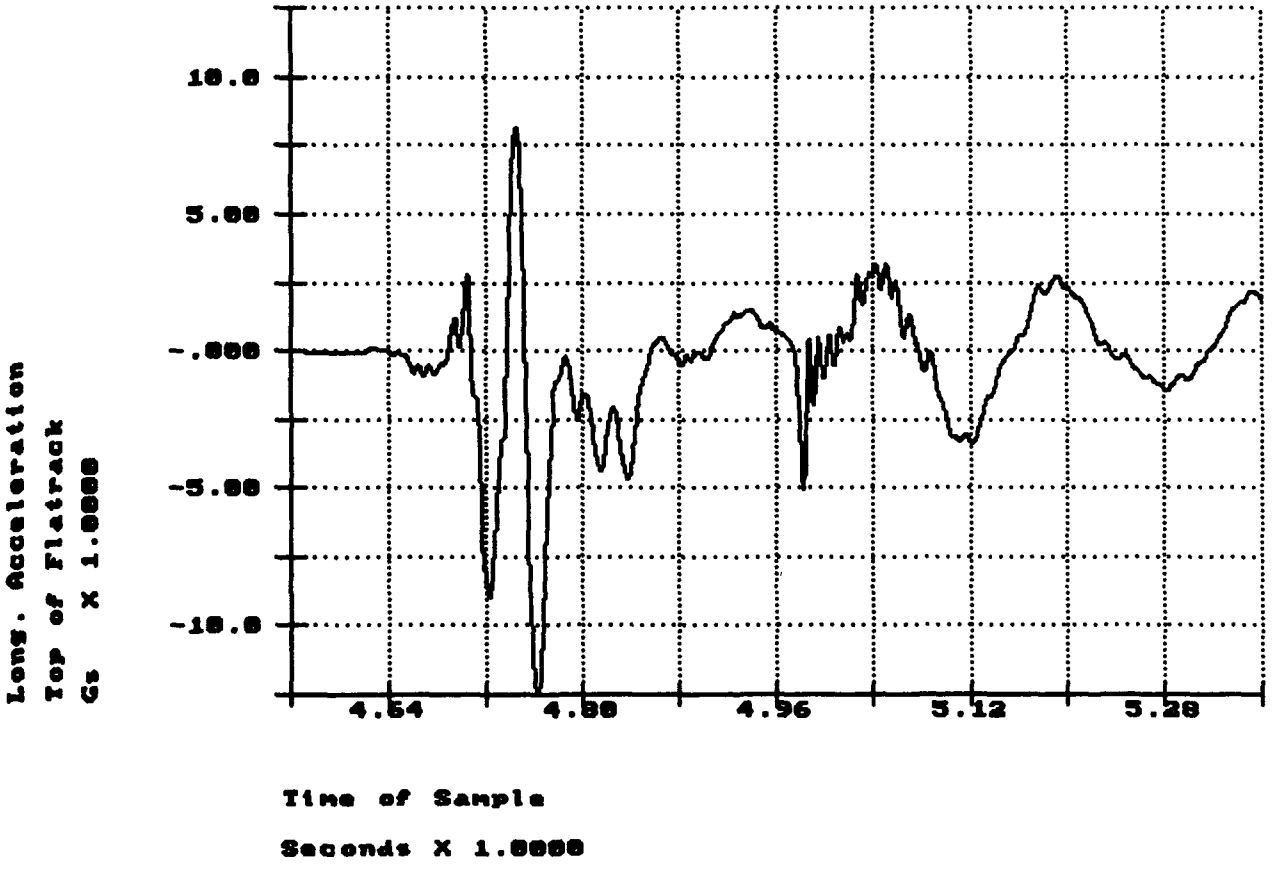
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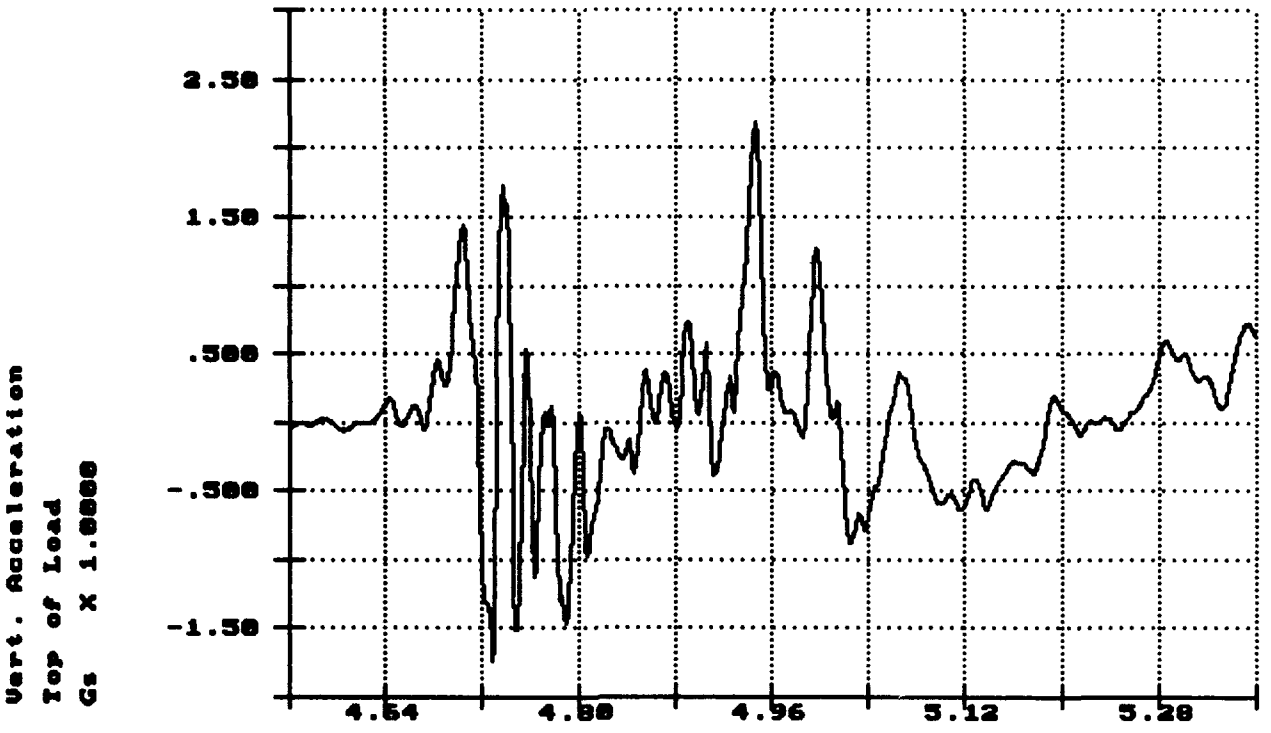
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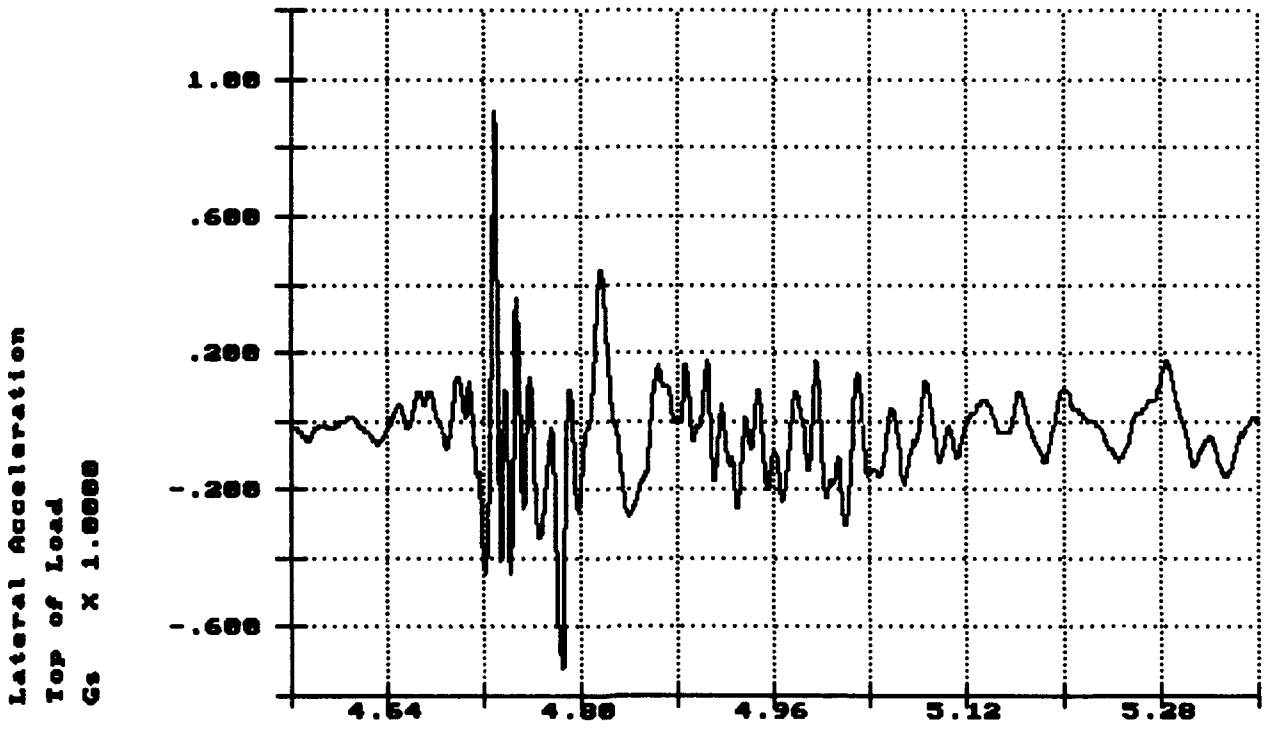
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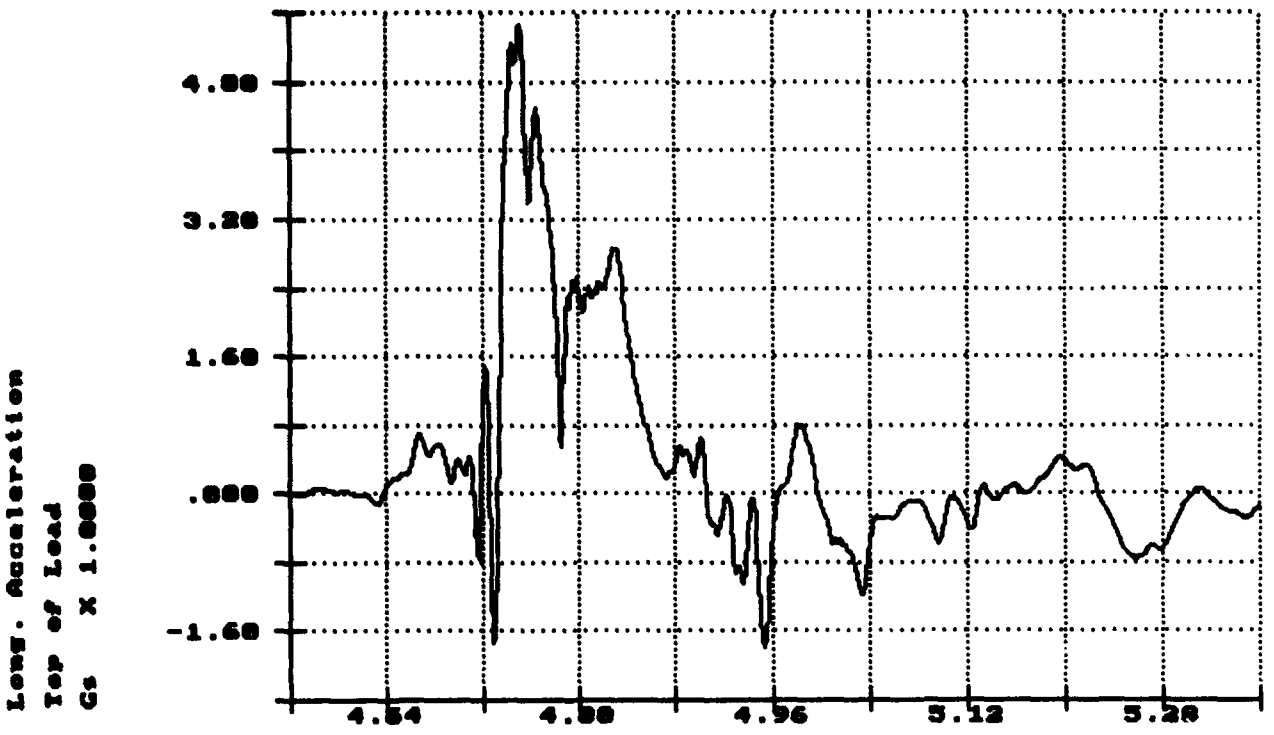
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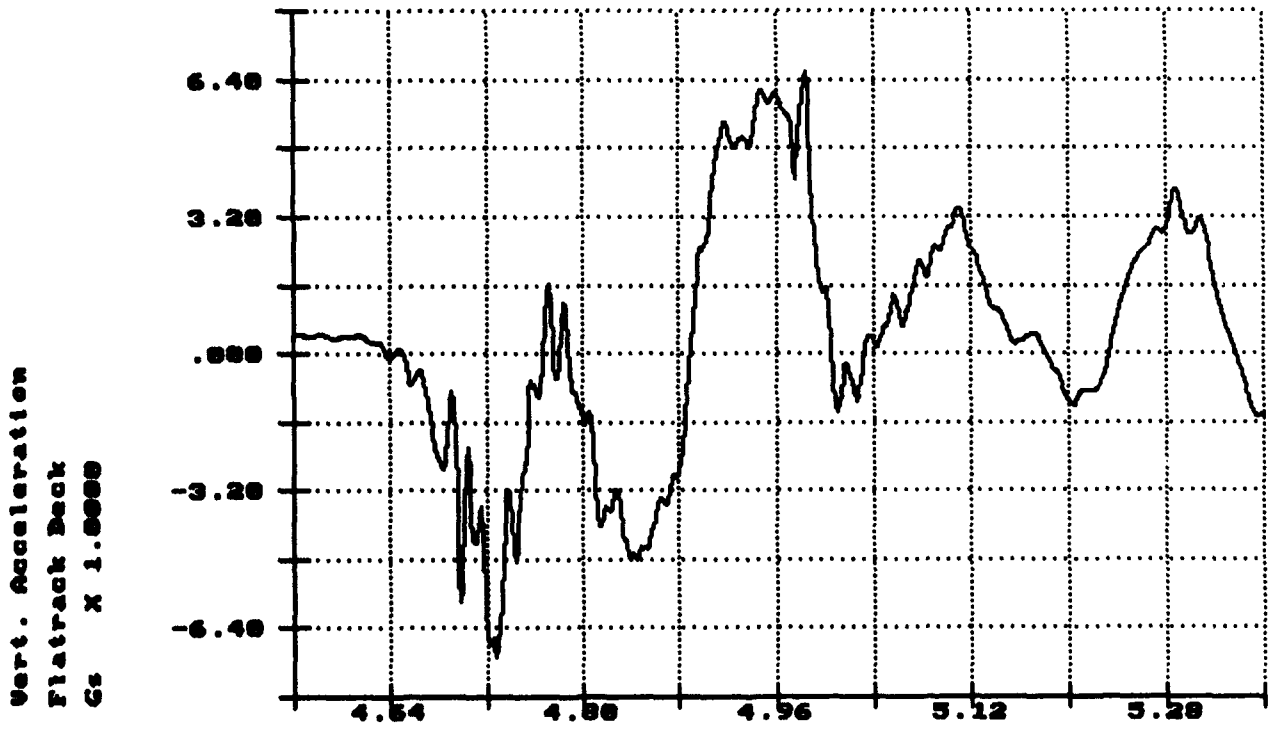
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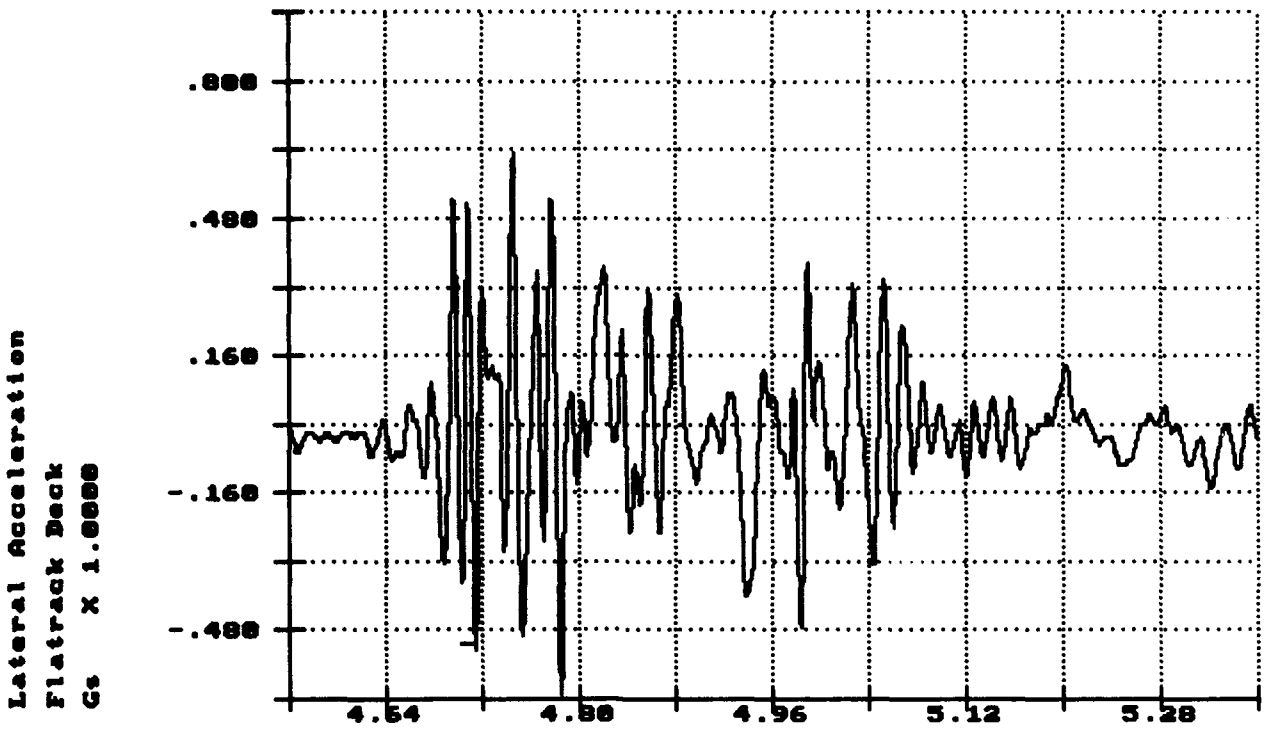
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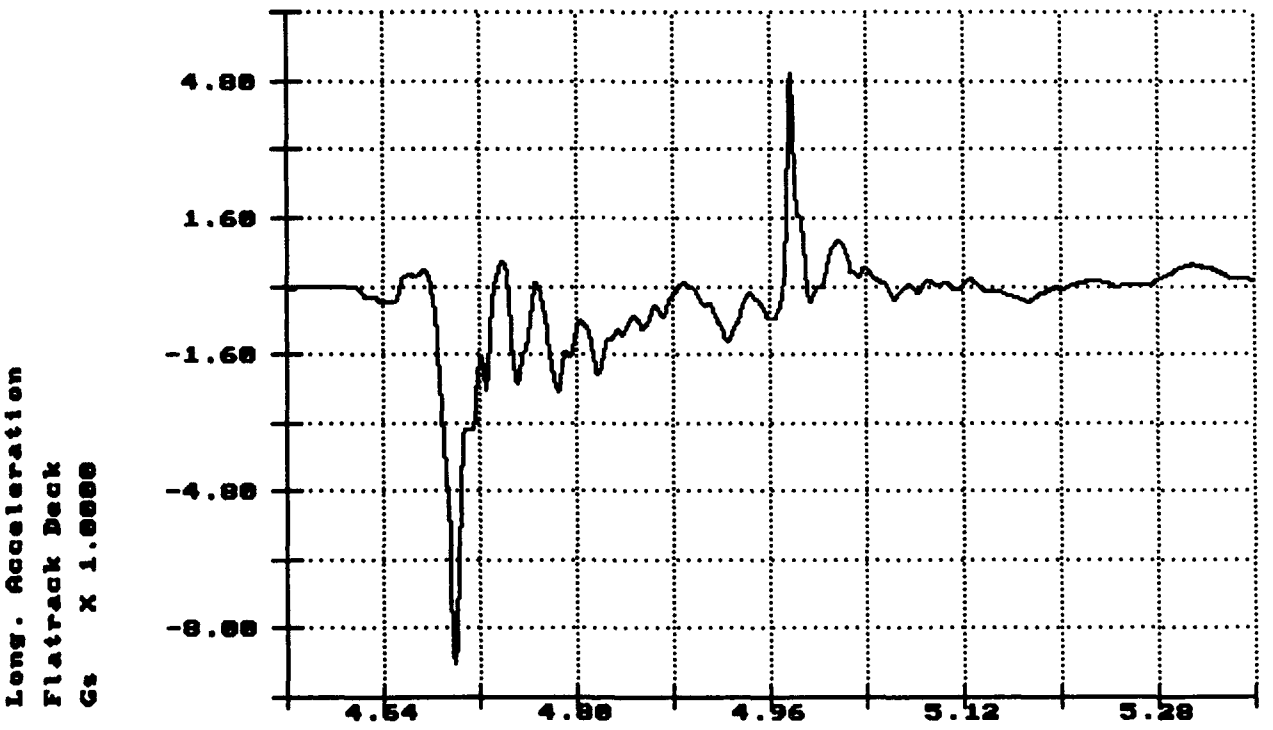
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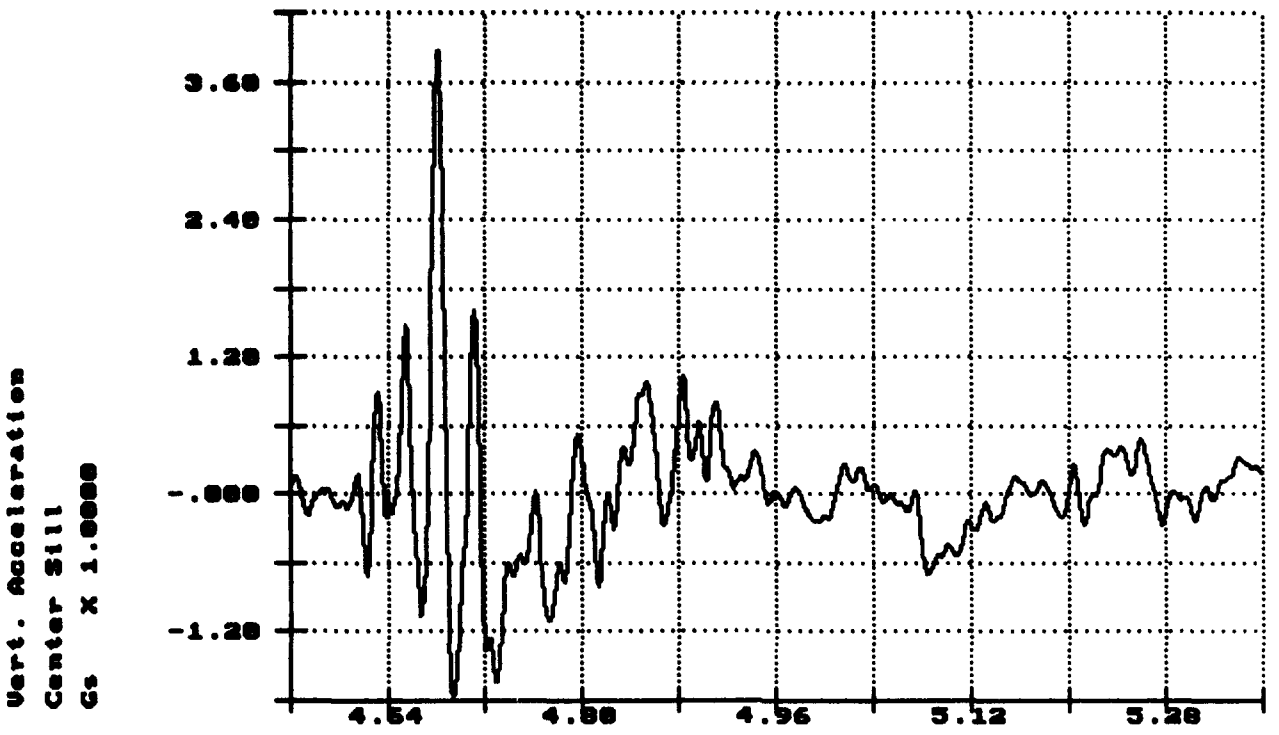
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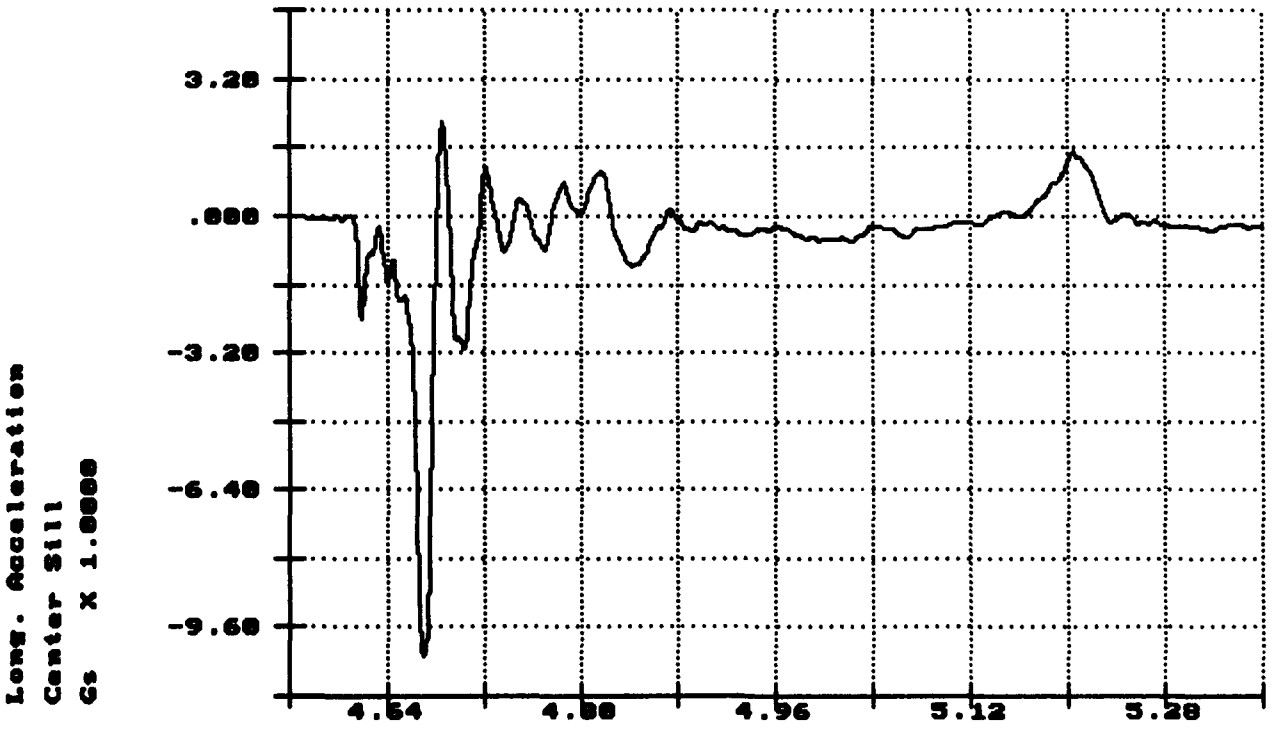
R.I. of PLS Flatrack, Impact 4: 8.52MPH Nov 23 14:11:57 1993



R.I. of PLS Flatrack, Impact 4: 8.52MPH Nov 23 14:11:57 1993



R.I. of PLS Flatrack, Impact 4: 8.52MPH Nov 23 14:11:57 1993



TEST NO. 7

RAIL IMPACT DATA

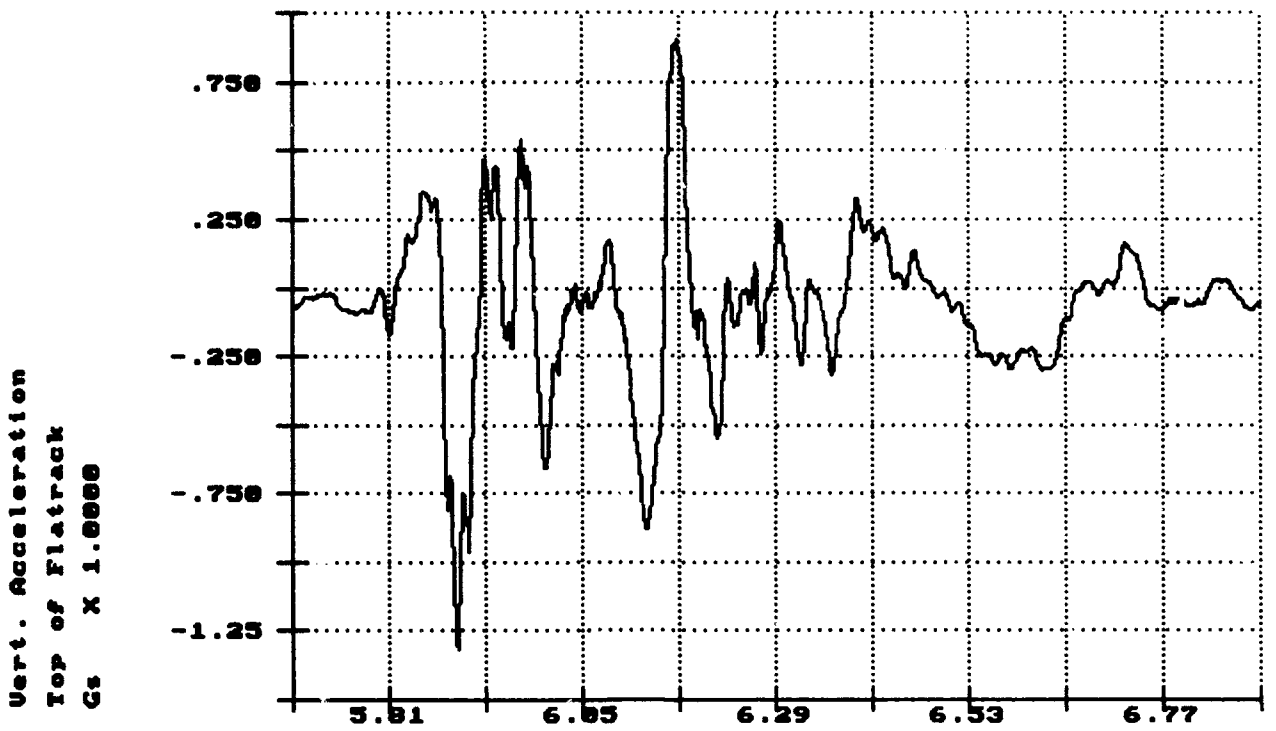
Test No.: 7 **Date: 24 November 1993**

Specimen Load: PLS truck with an EPF loaded with 155MM SLPs.

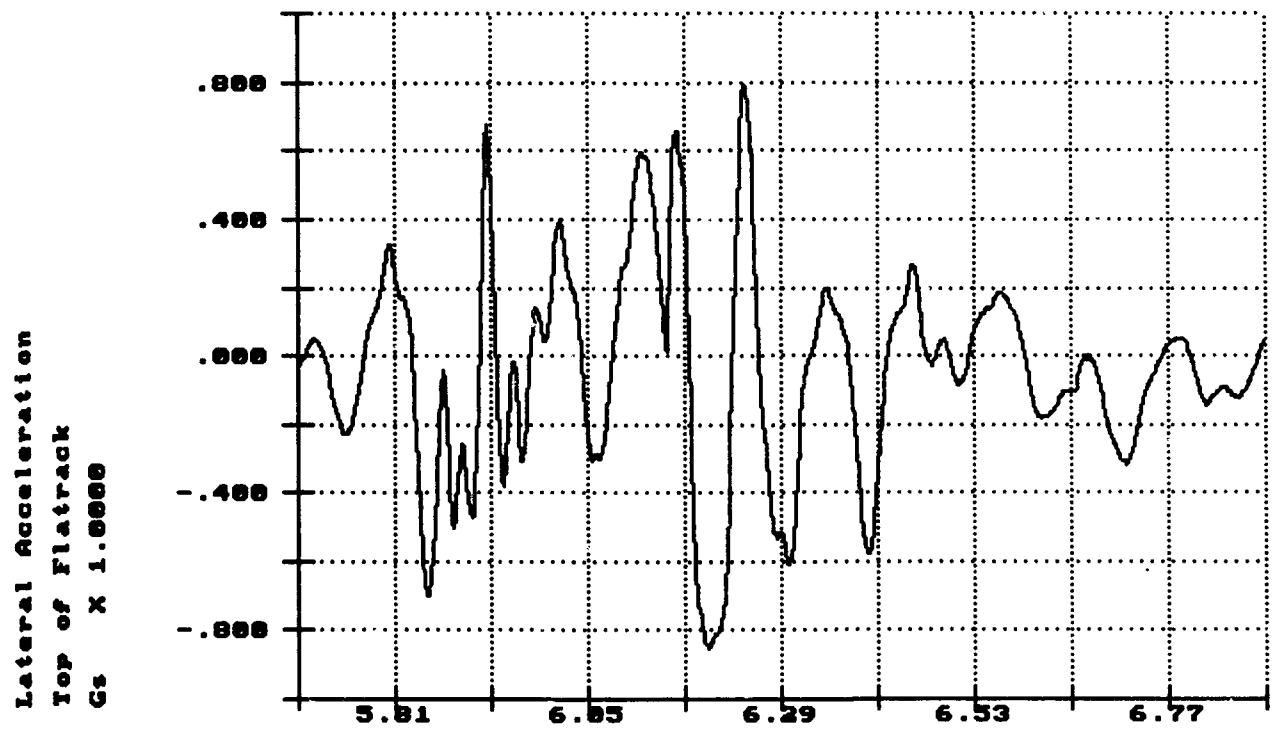
Flatcar No.: EJ&E 6001	**Lt. Wt.: 57,200**
PLS Truck	**Wt.: 54,750**
EPF No. 1	**Wt.: 7,500**
Lading, 155MM SLPs.	**Wt.: 28,000**
	Total Specimen Wt.: 147,450
	Buffer Car (five cars) Wt: 250,000

Impact	End Struck	Velocity	Remarks
1	Rear	4.66	Load shifted 1-inch to rear of EPF.
2	Rear	7.08	No change.
3	Rear	8.66	No change.
4	Forward	8.33	Load shifted 1-inch forward on EPF.

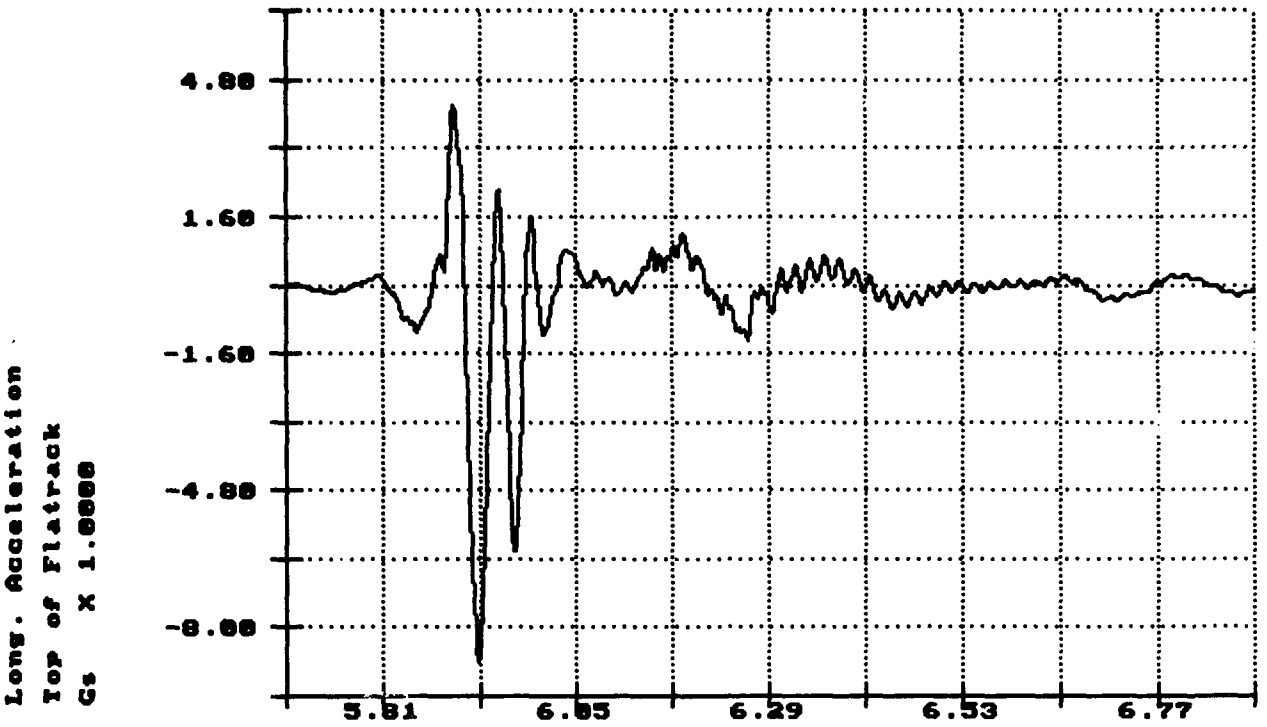
R.I. of PLS Truck, Impact 1: 4.66 MPH Nov 24 13:22:51 1993



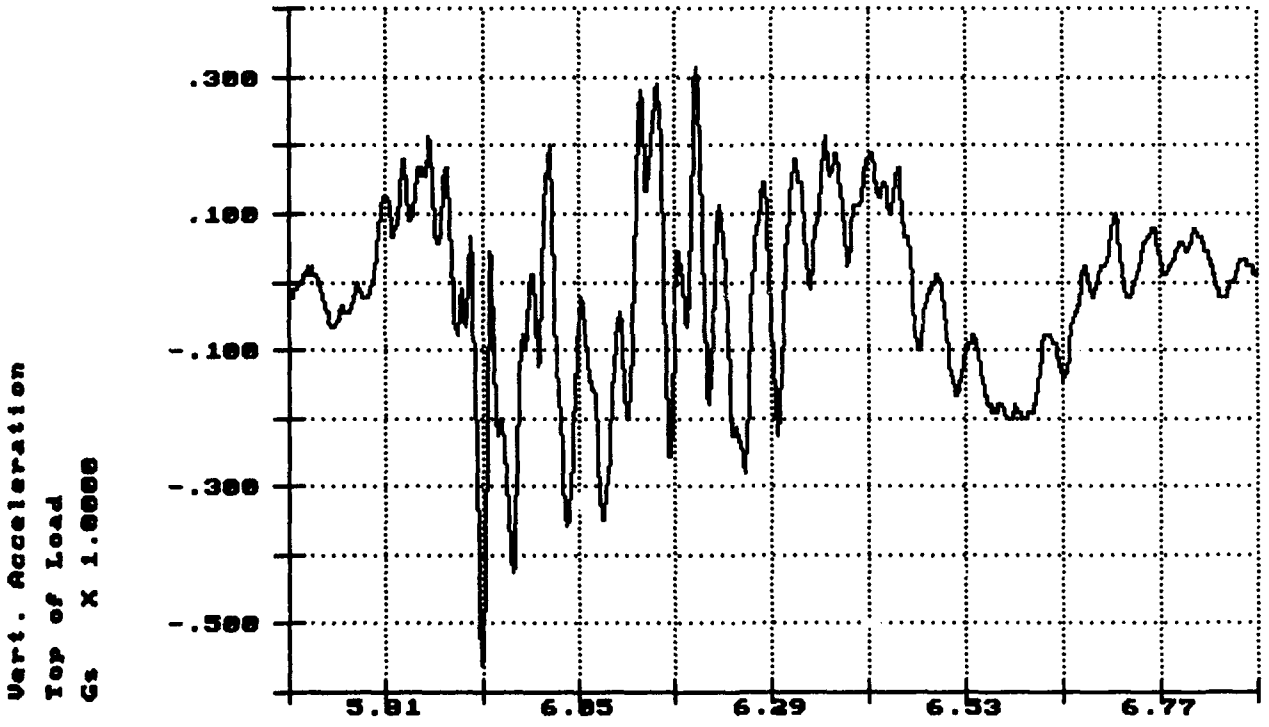
R.I. of PLS Truck, Impact 1: 4.66 MPH Nov 24 13:22:51 1993



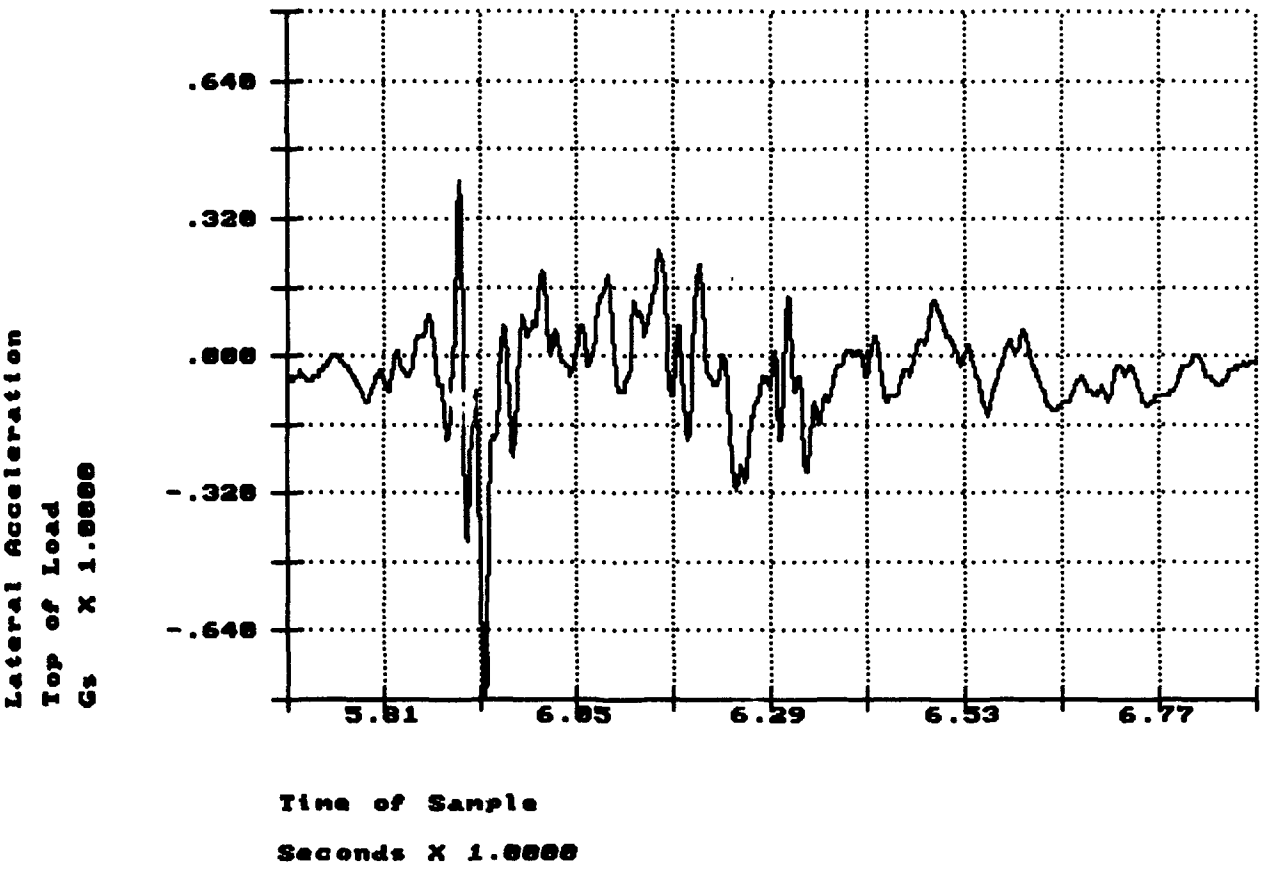
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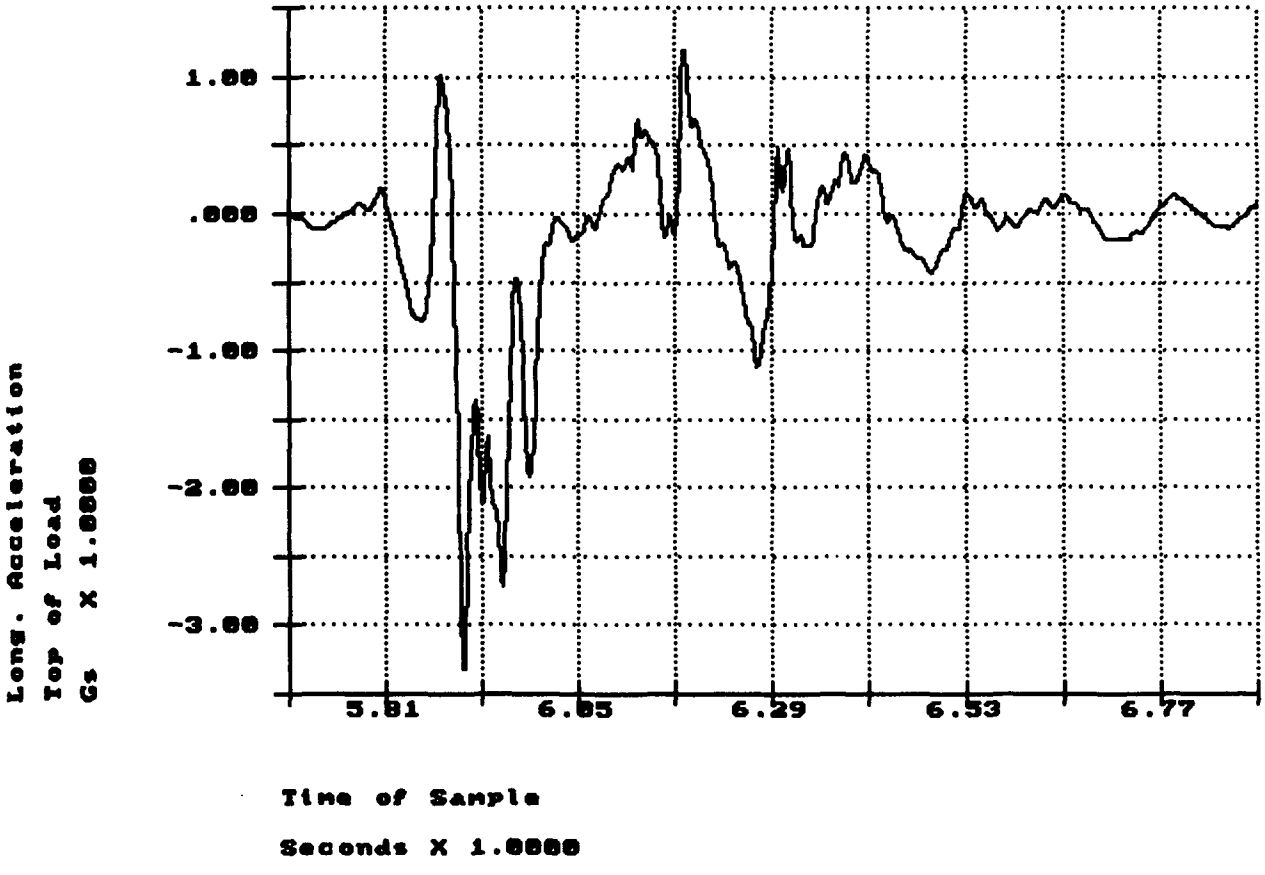
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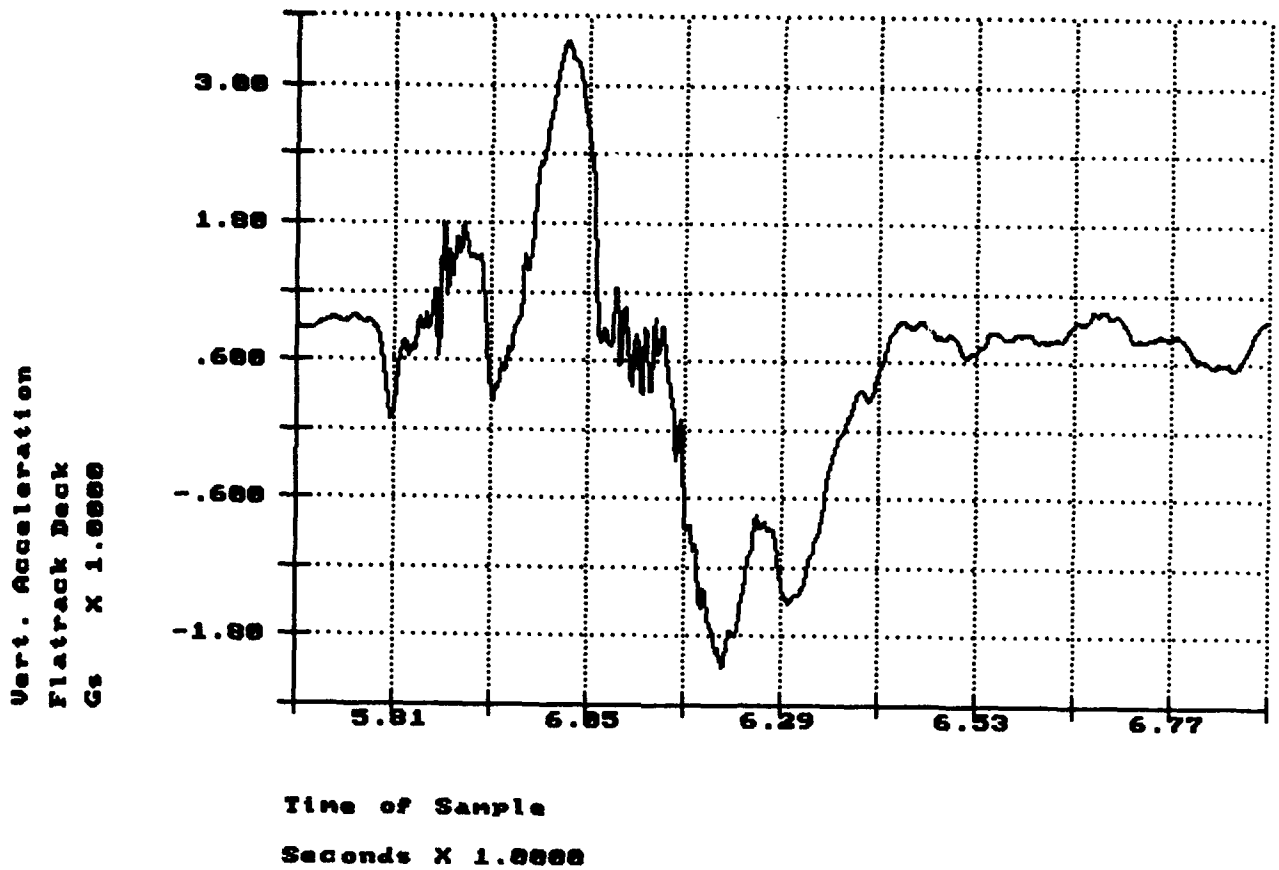
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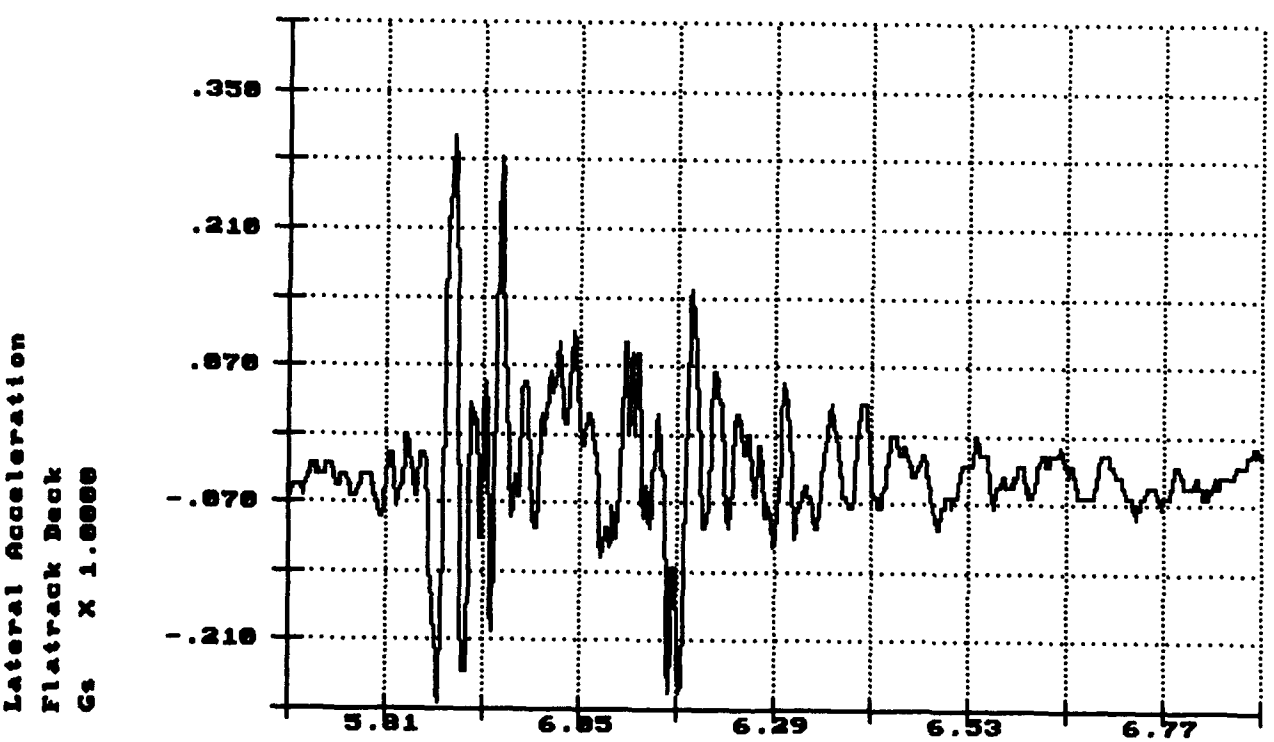
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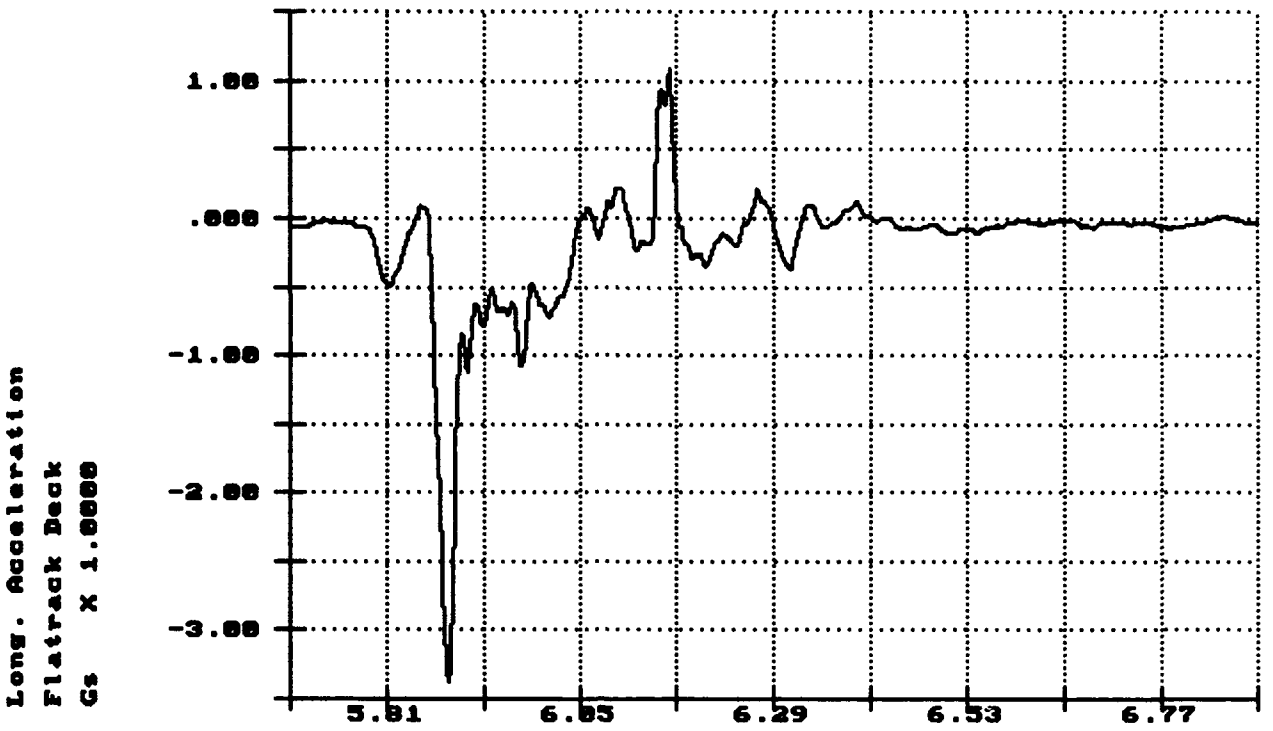
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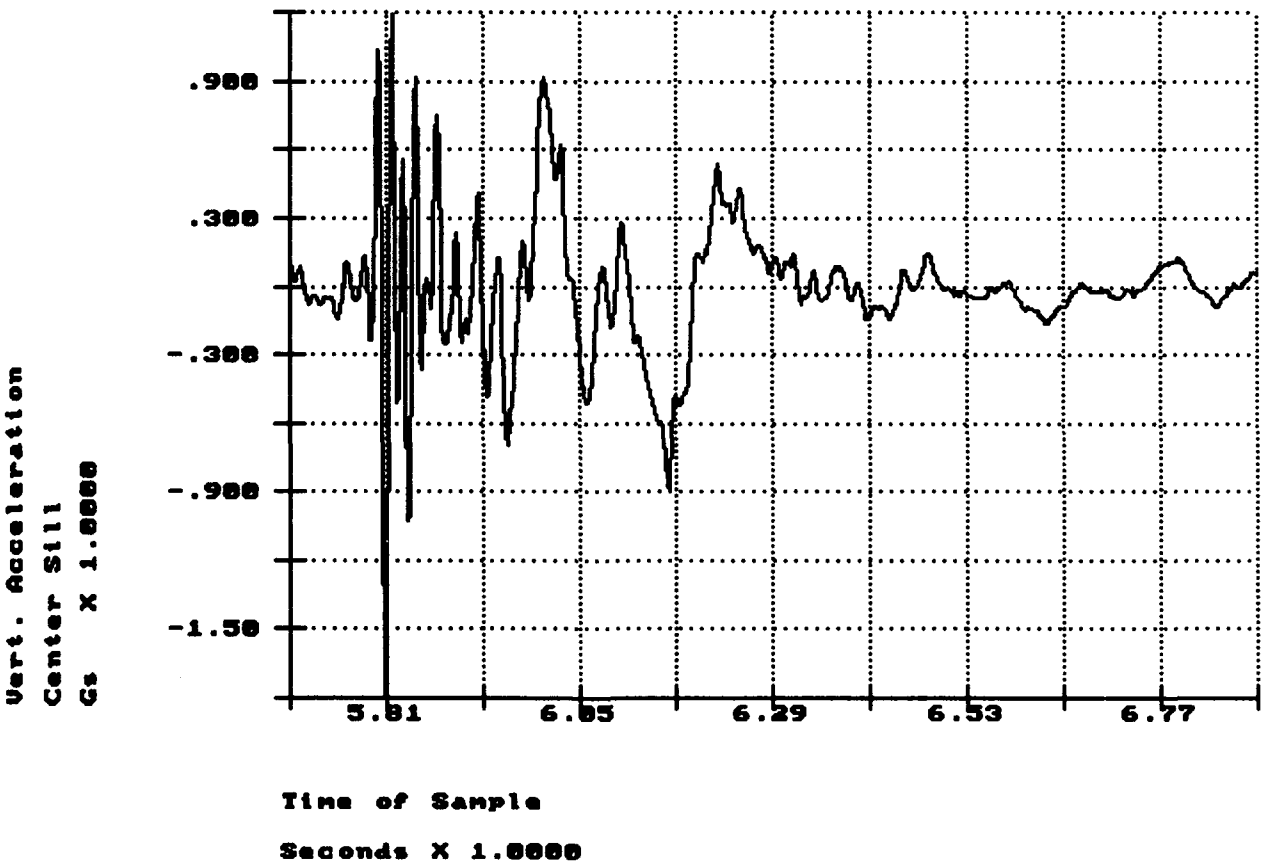
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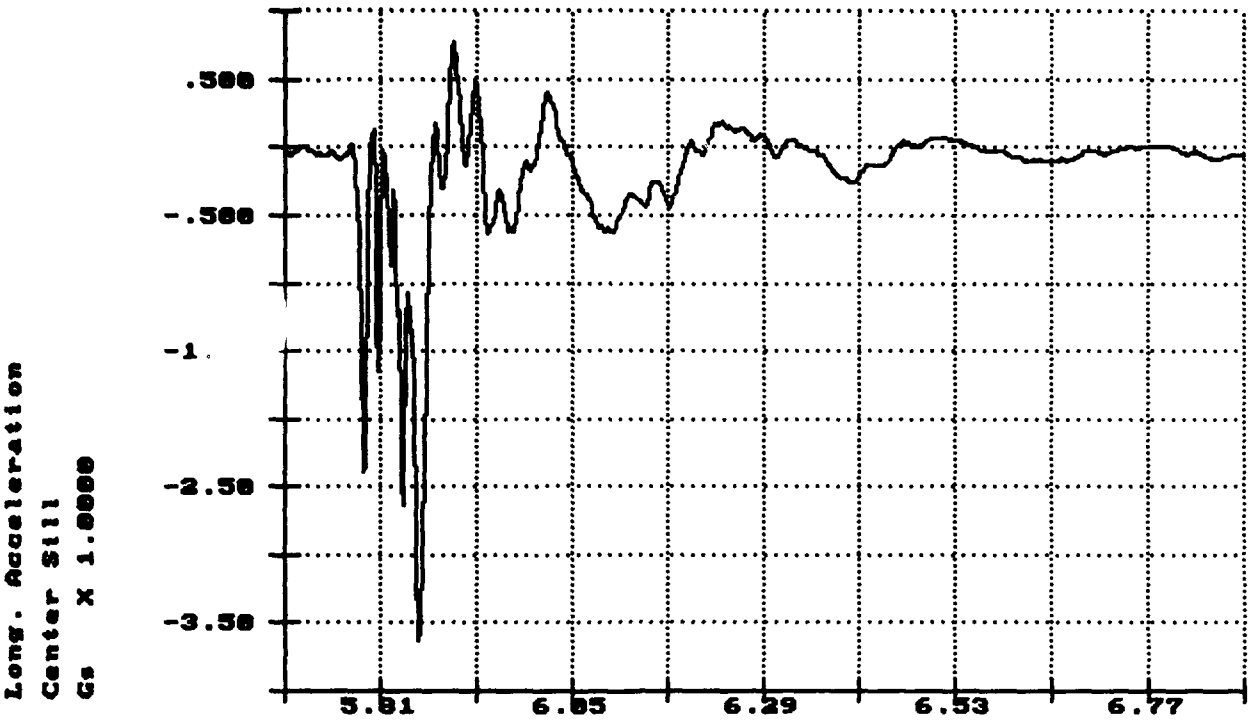
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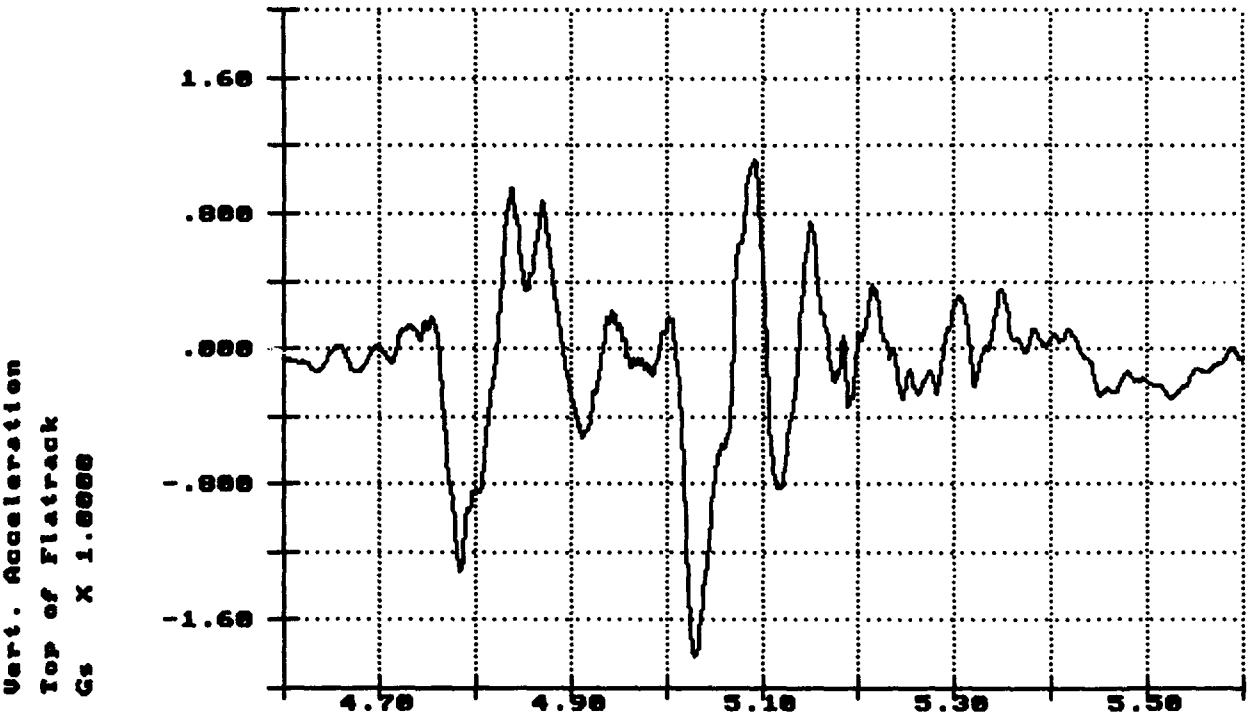
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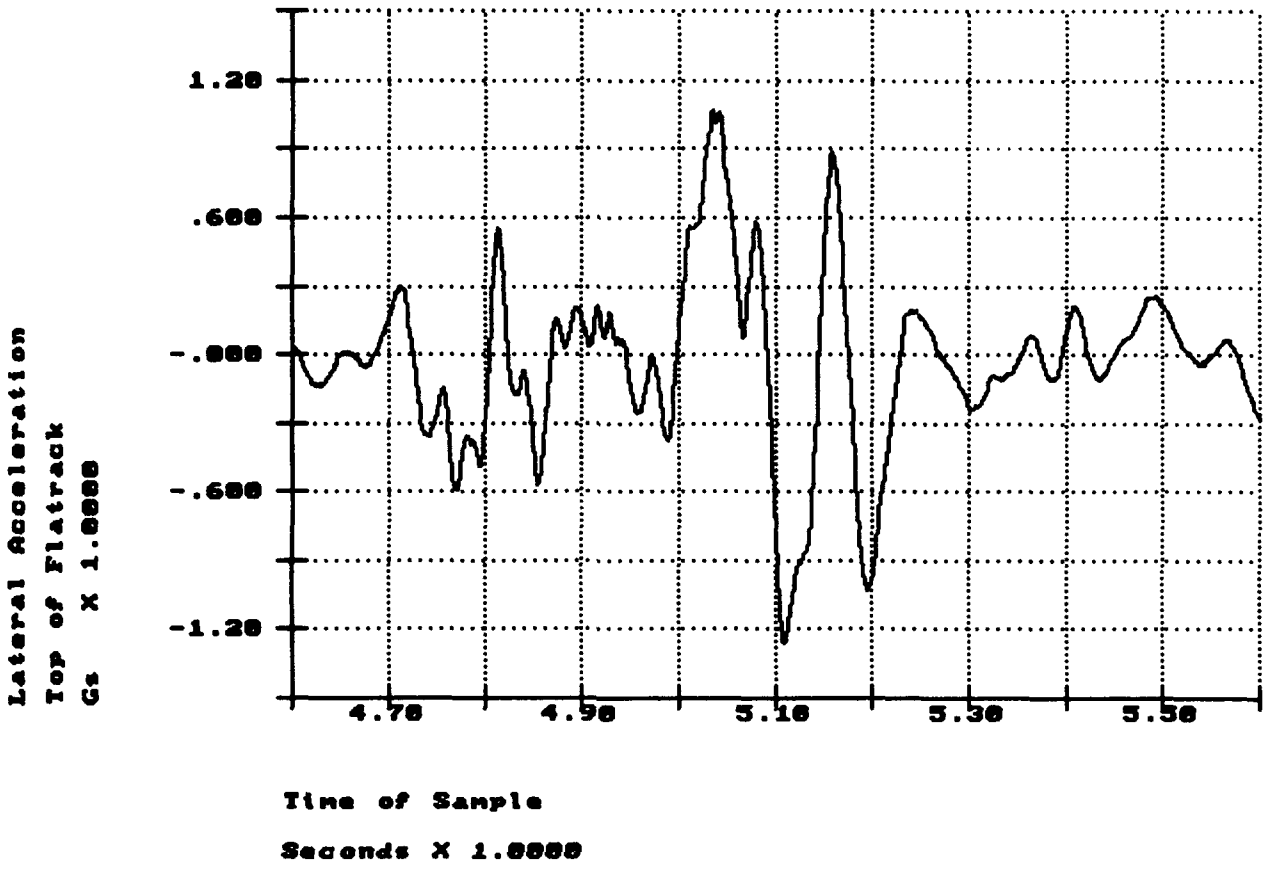
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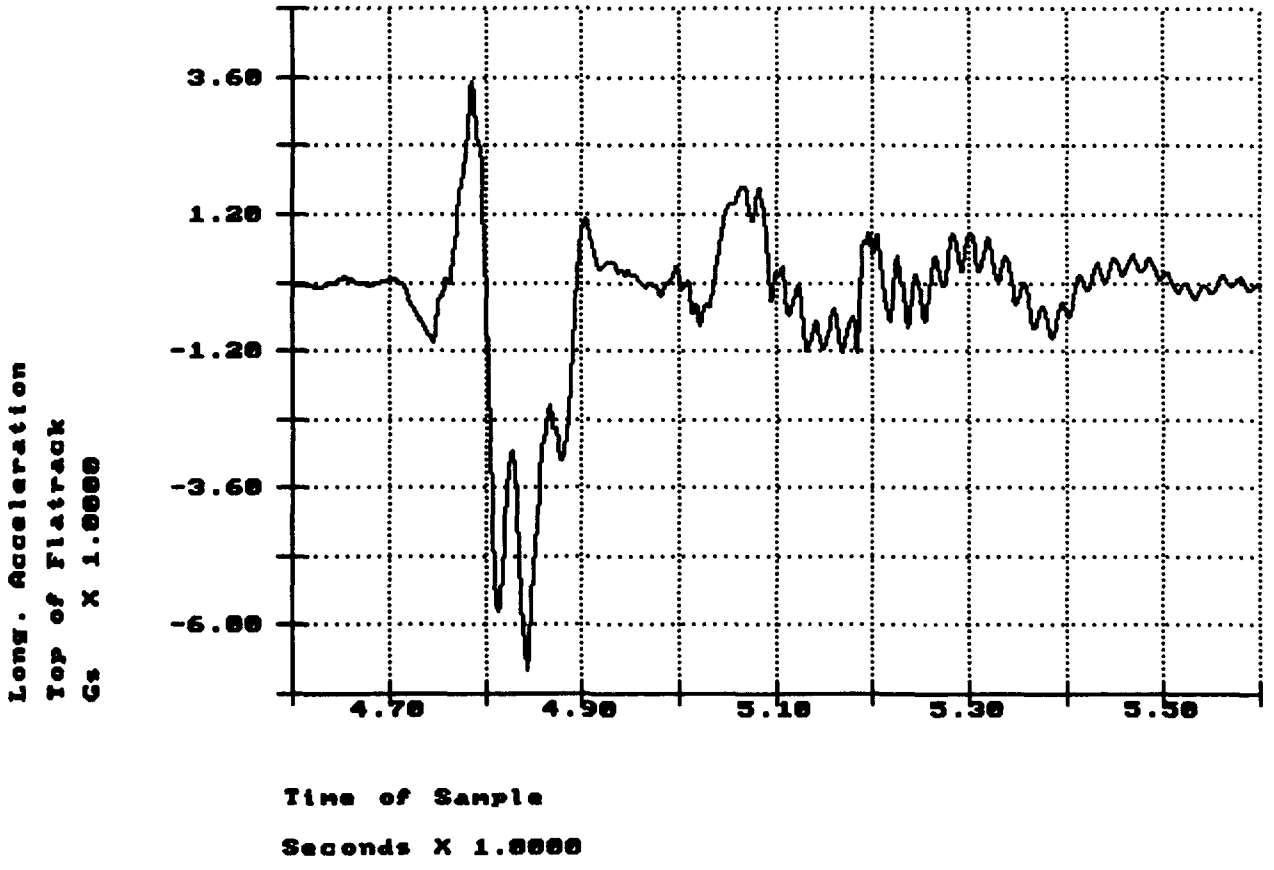
R.I. of PLS Truck, Impact 2: 7.88 MPH Nov 24 13:29:06 1993



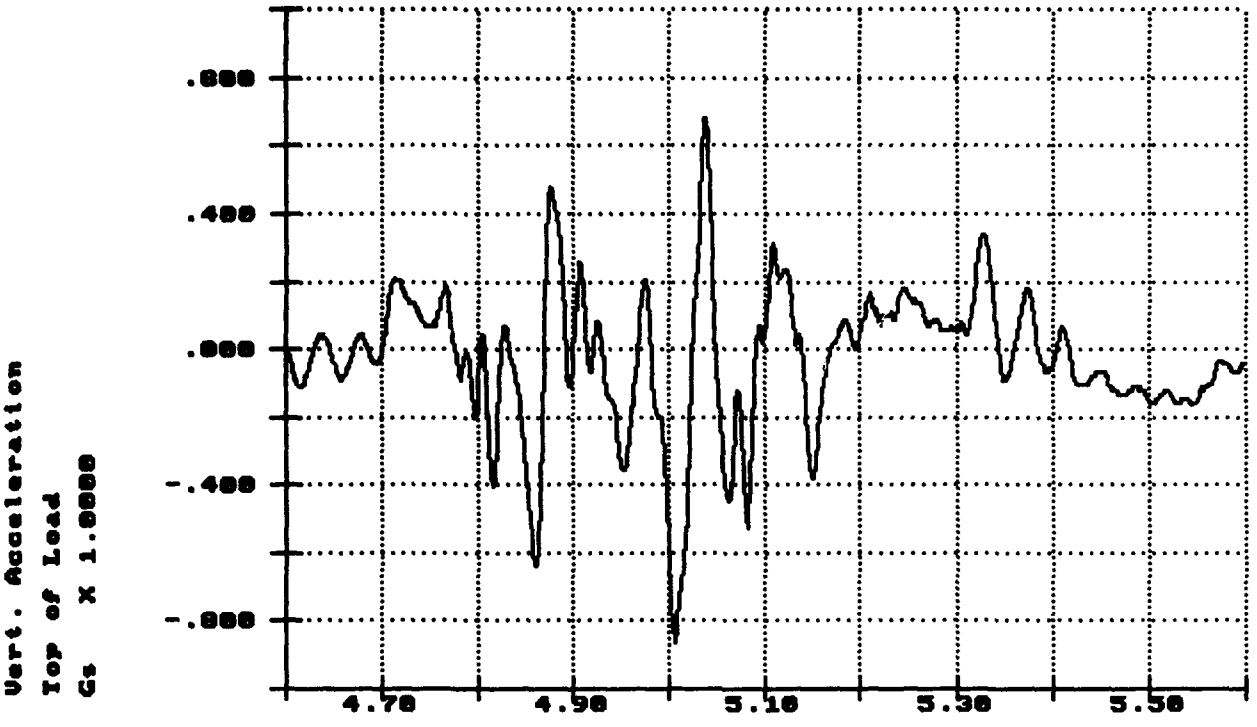
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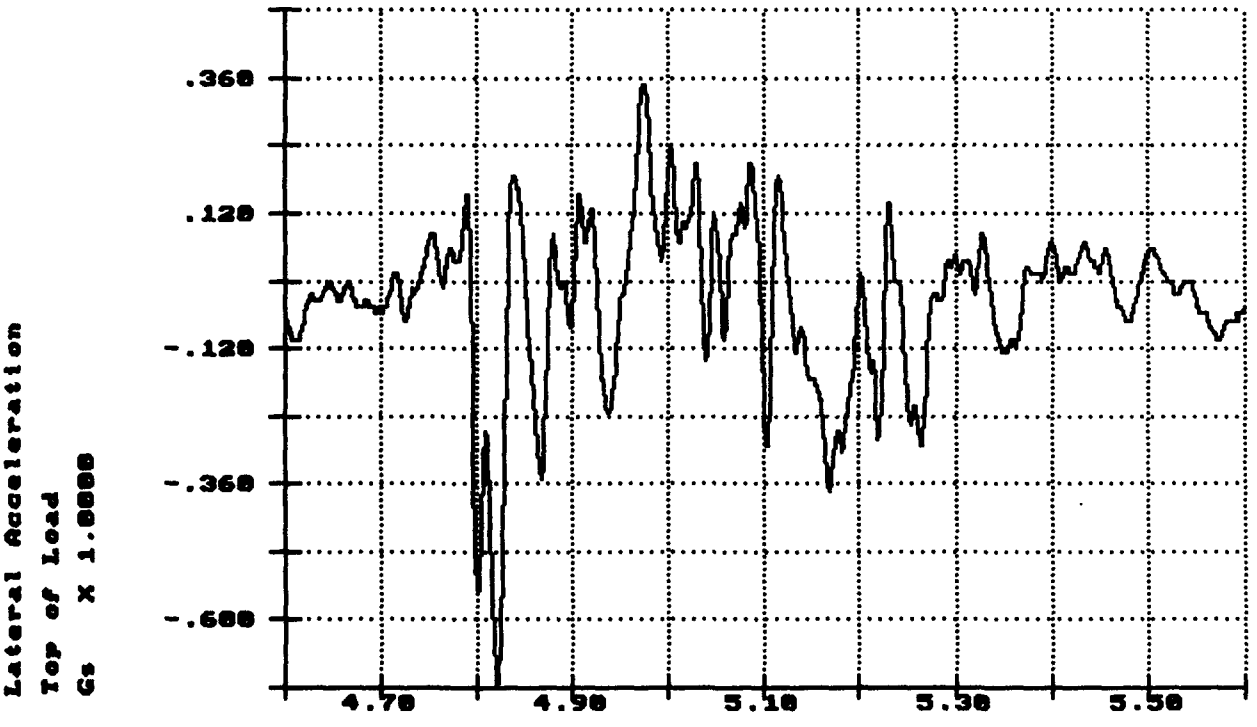
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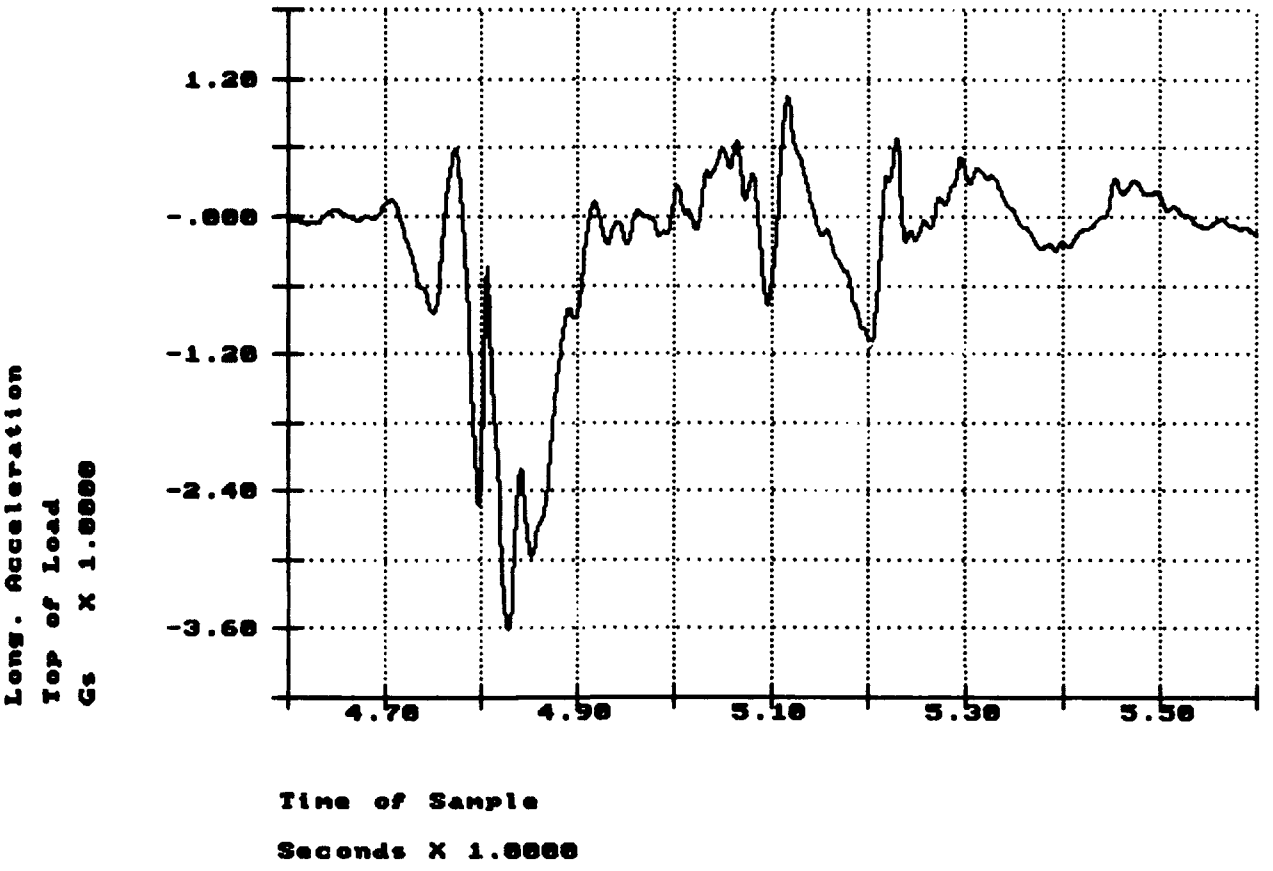
R.I. of PLS Truck, Impact 2: 7.08 MPH Nov 24 13:29:06 1993



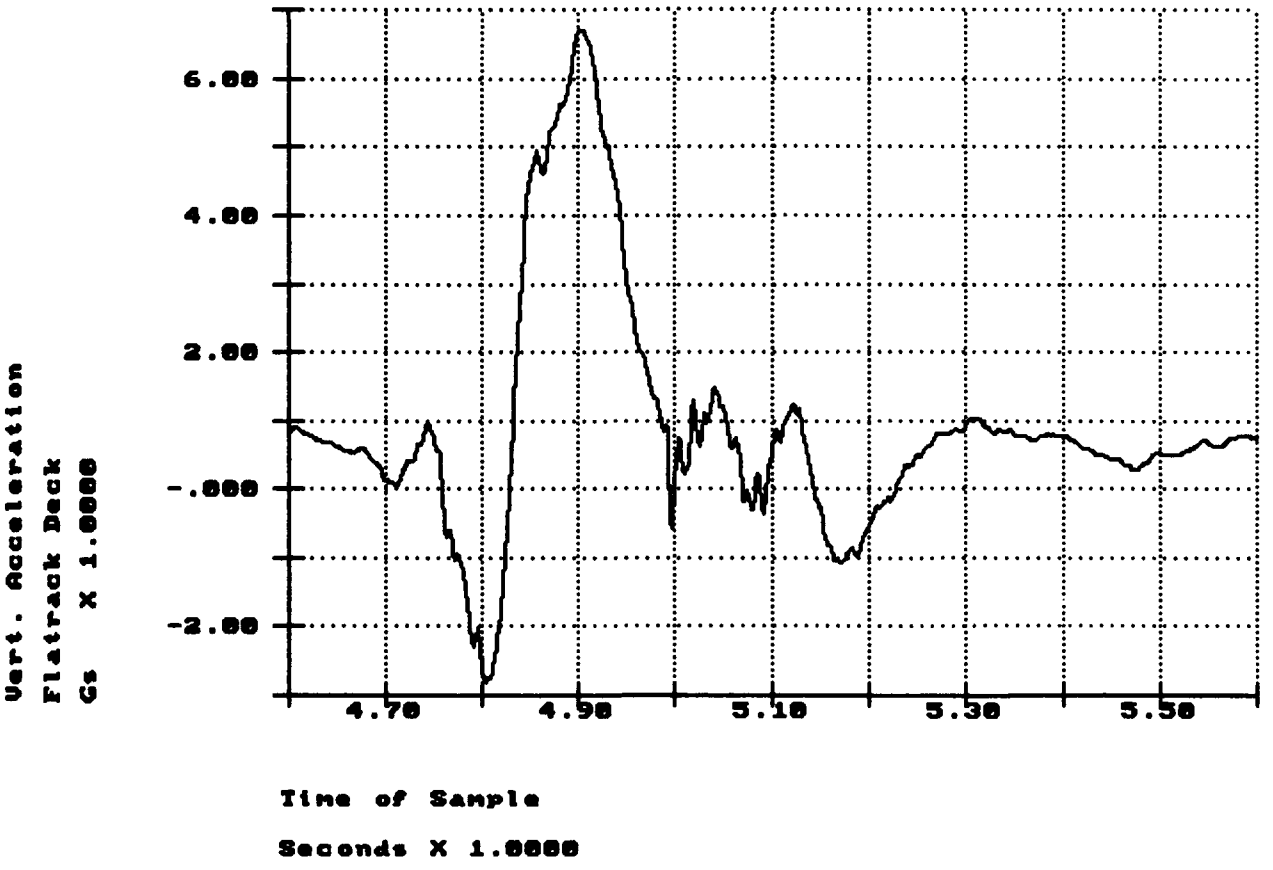
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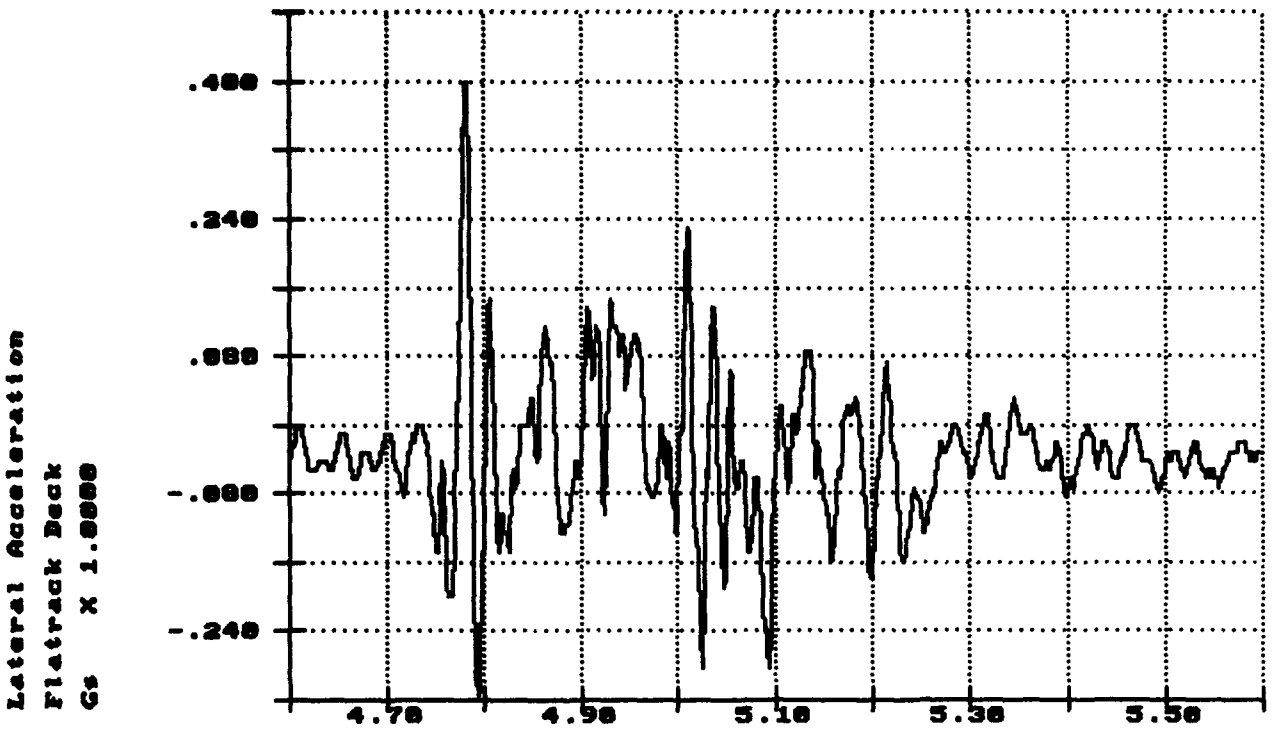
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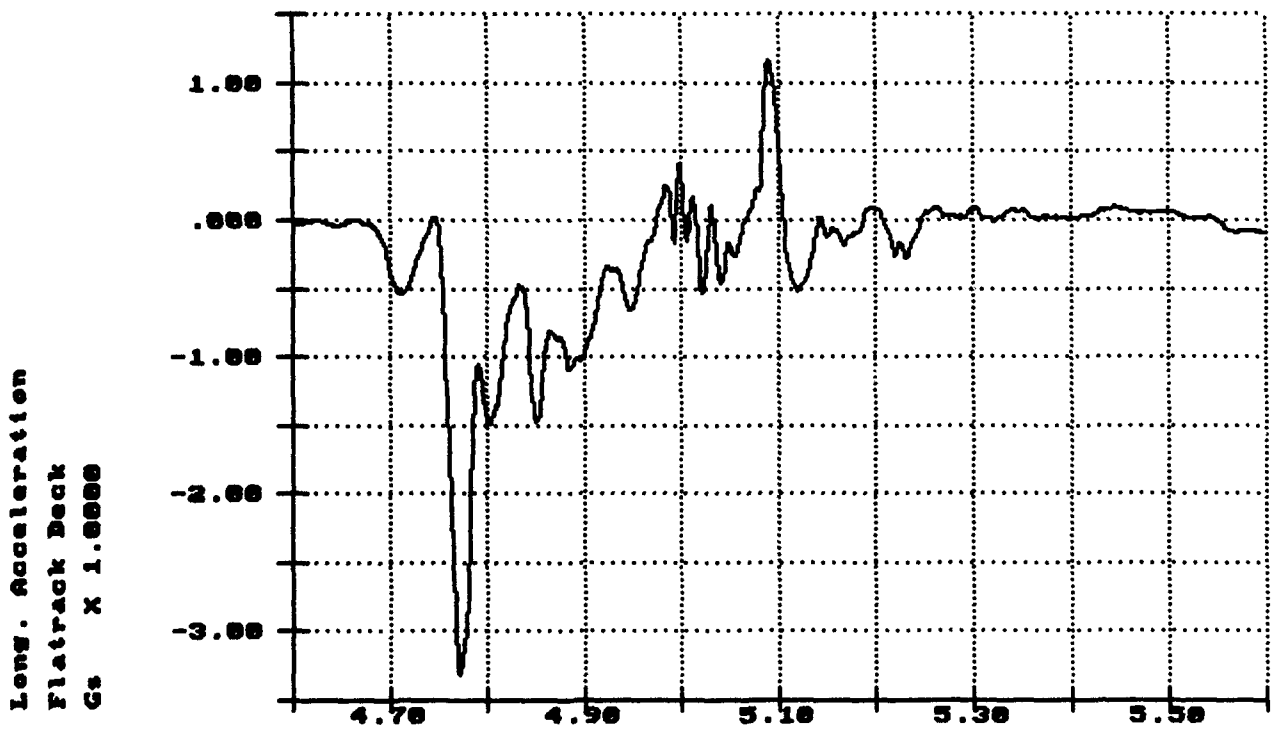
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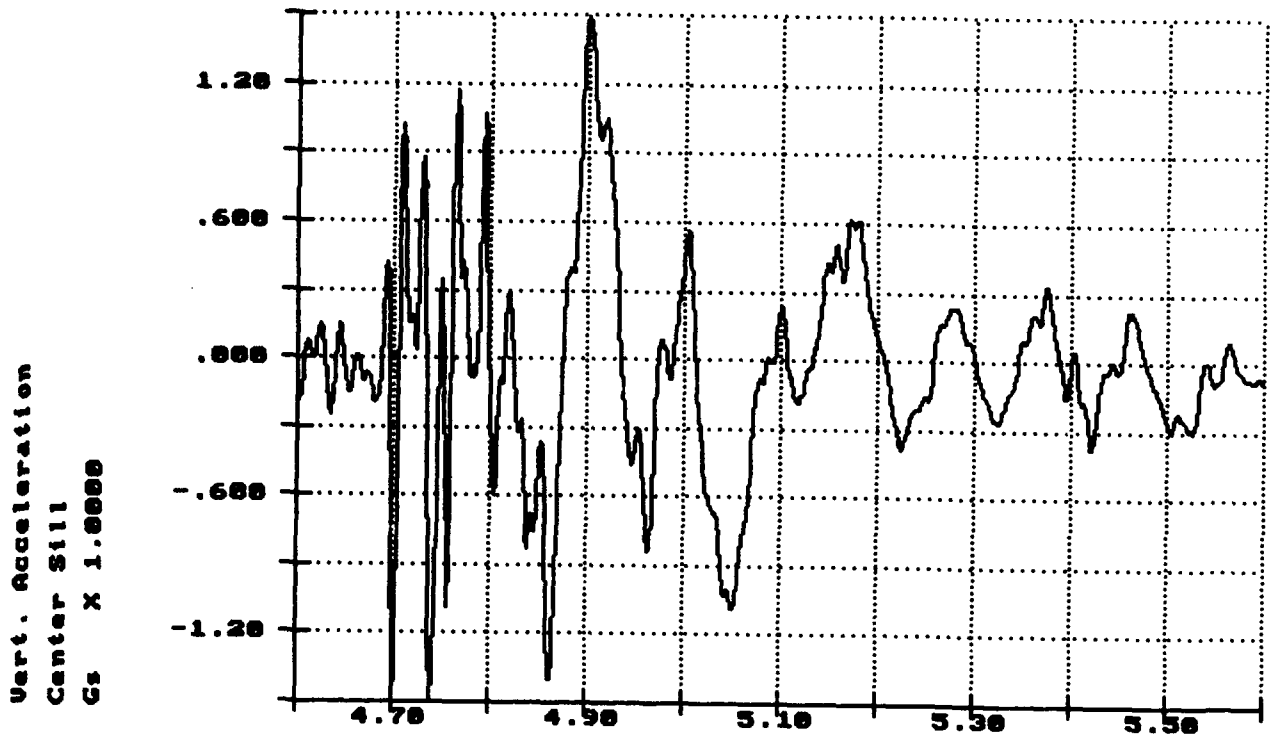
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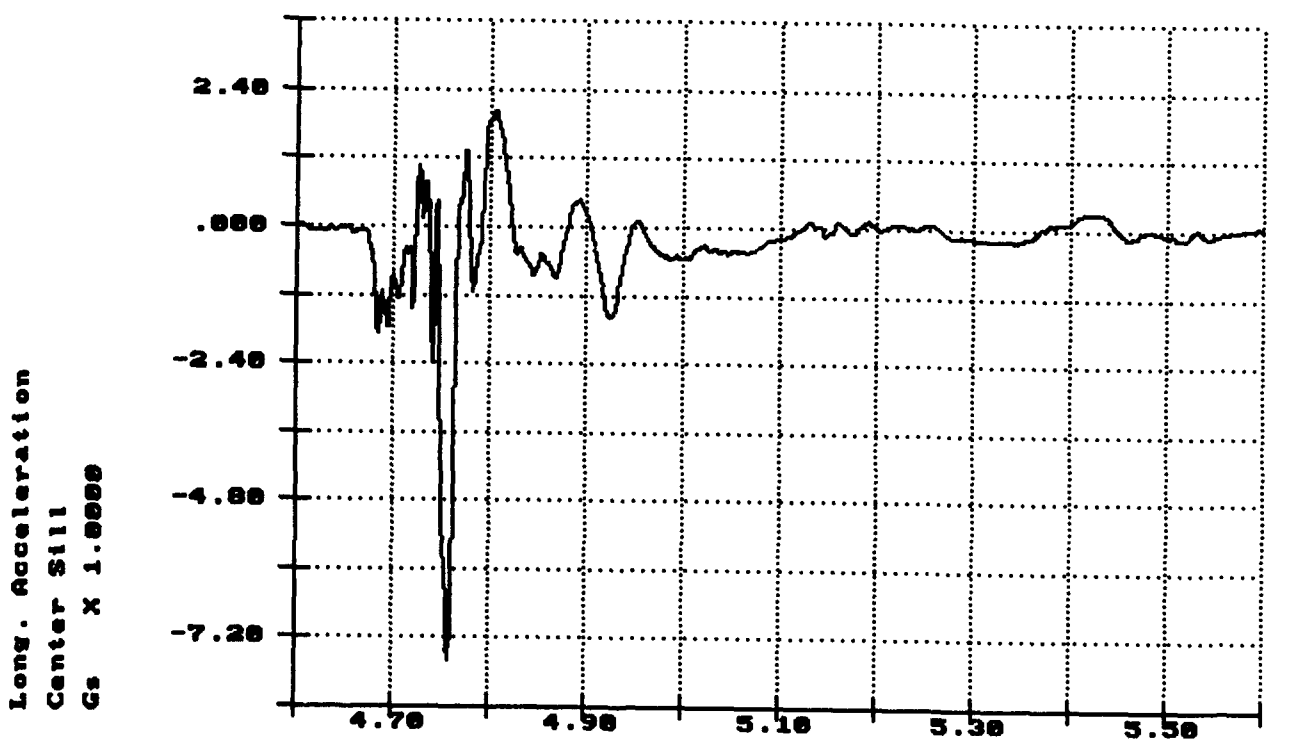
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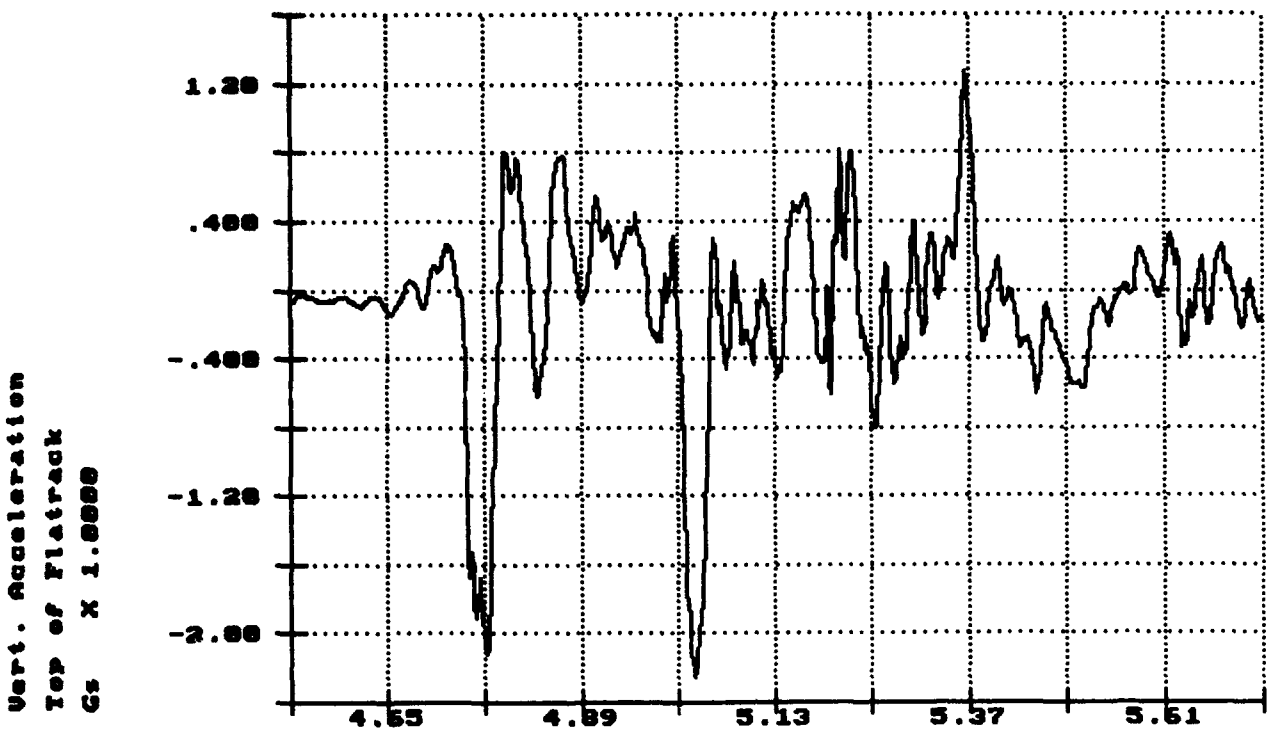
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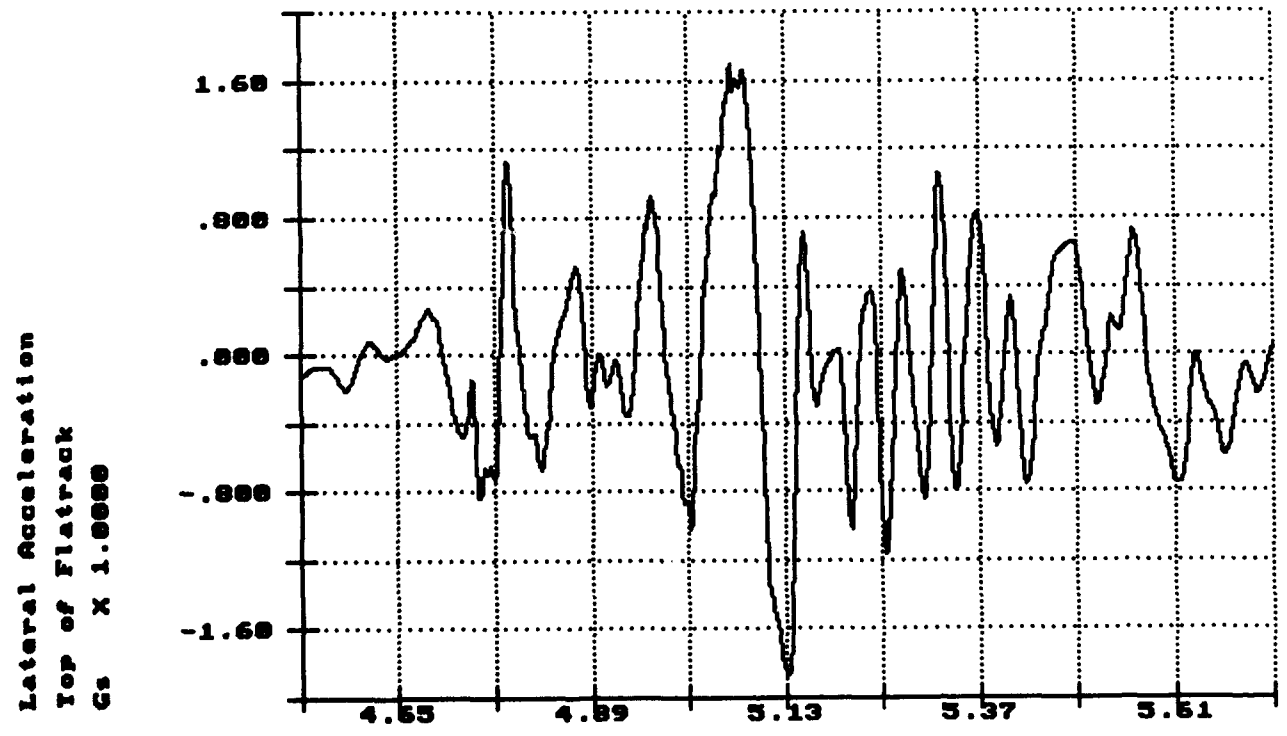
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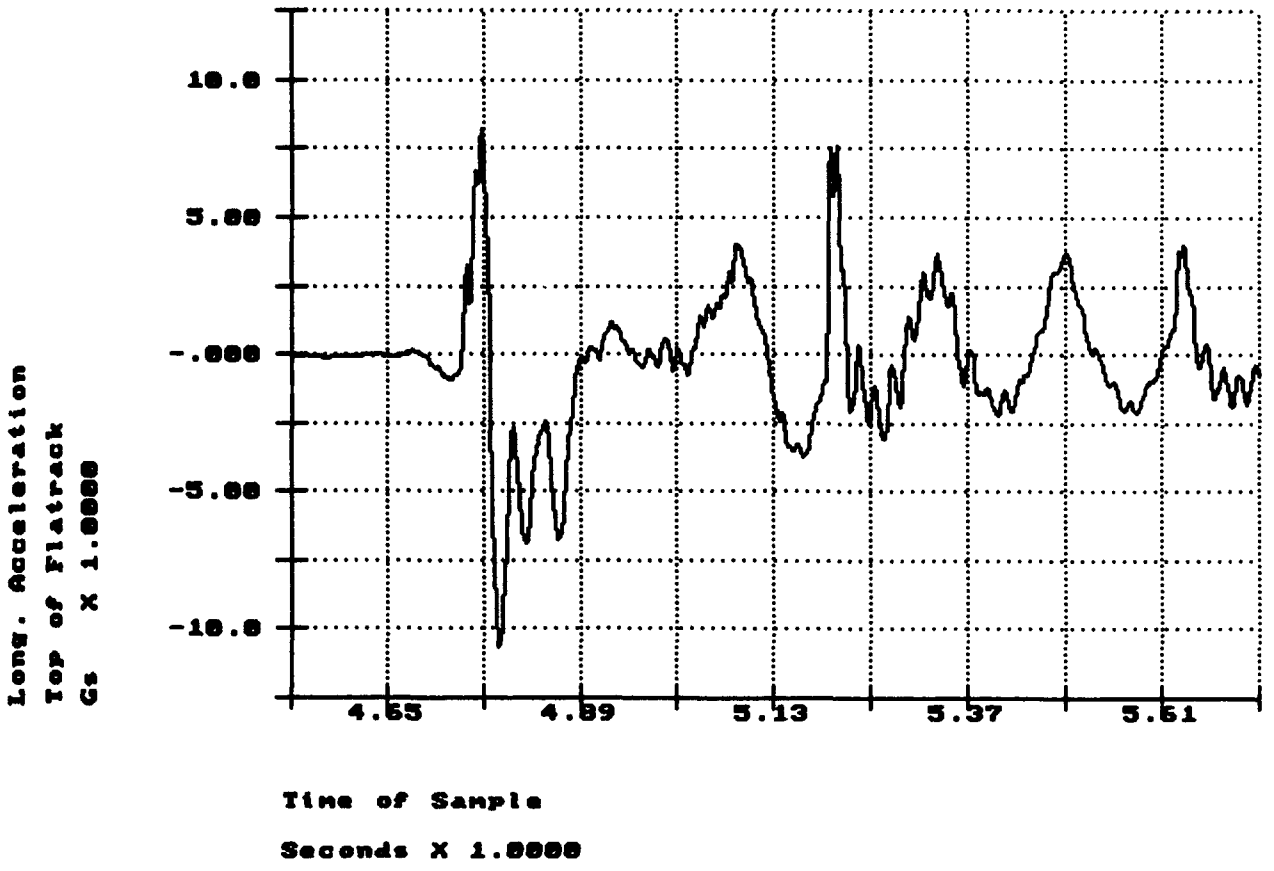
R.I. of PLS Truck, Impact 3: 8.62 MPH Nov 24 13:34:56 1993



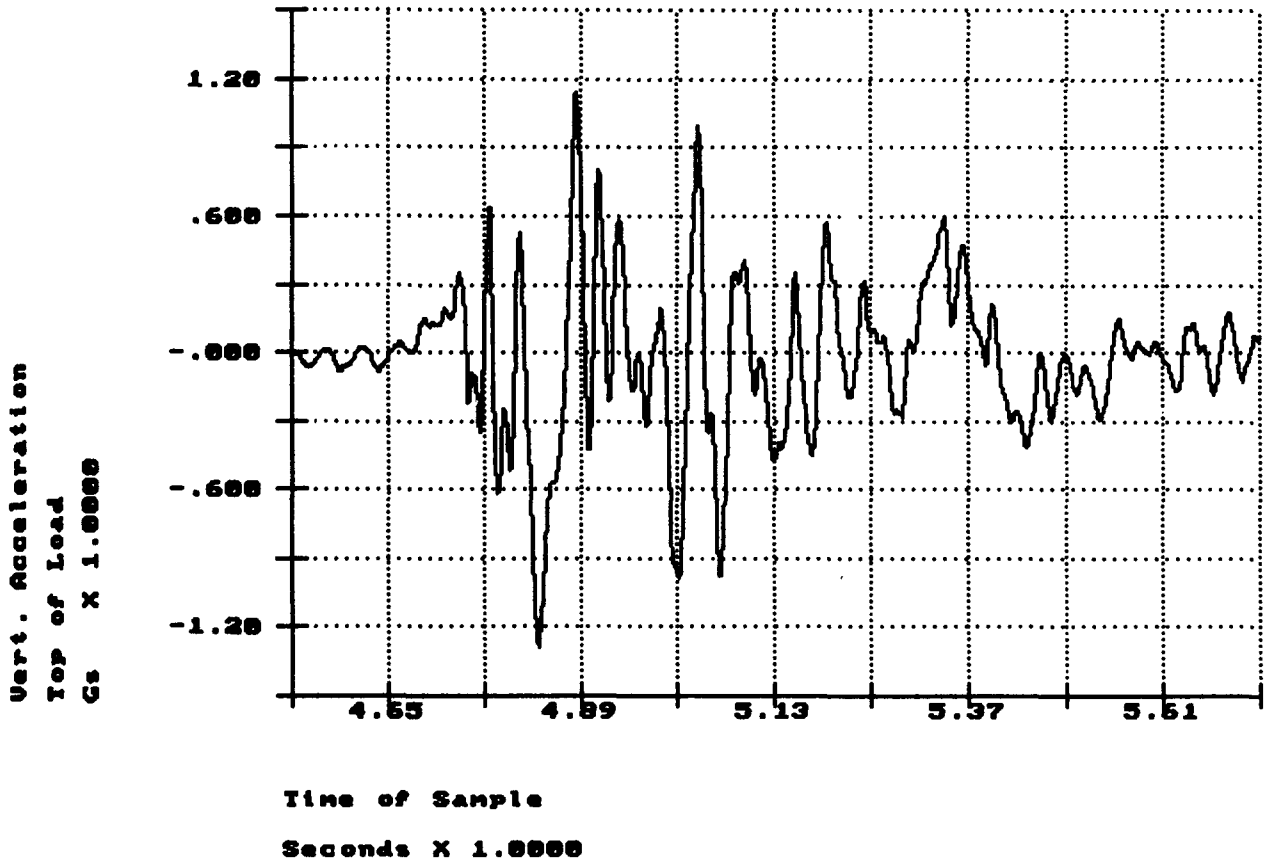
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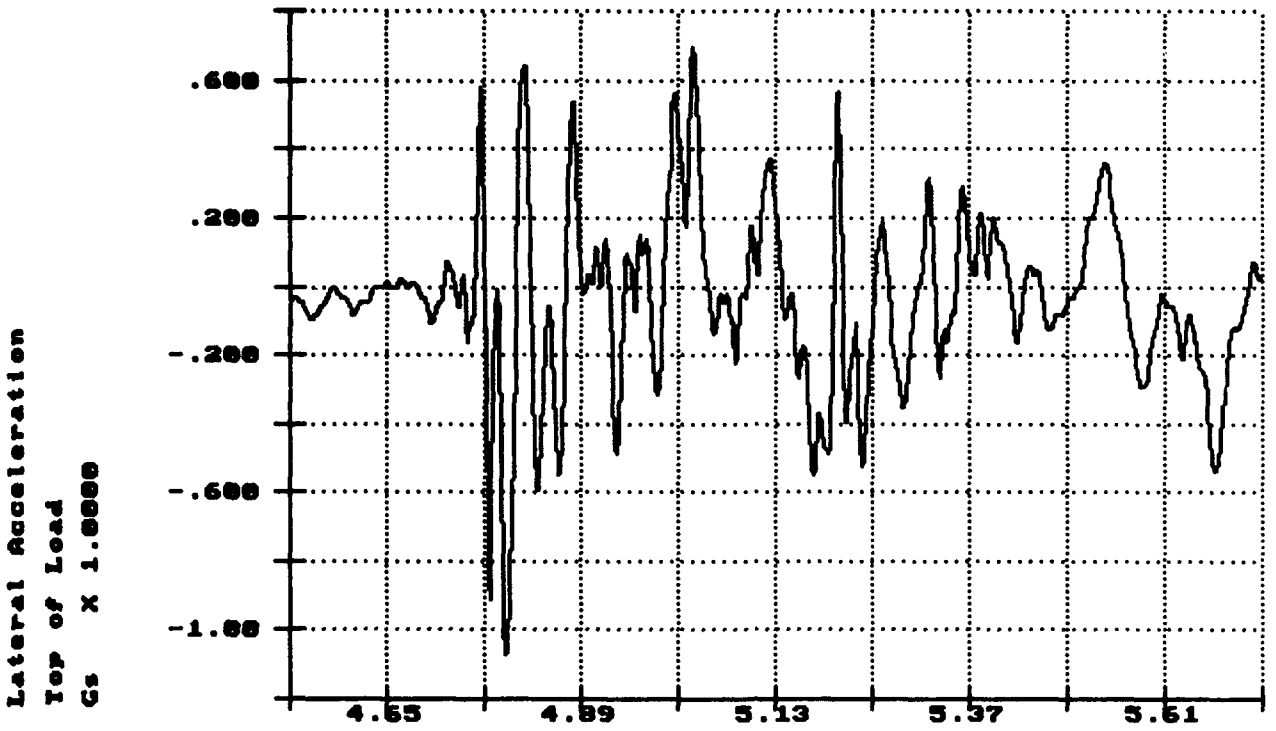
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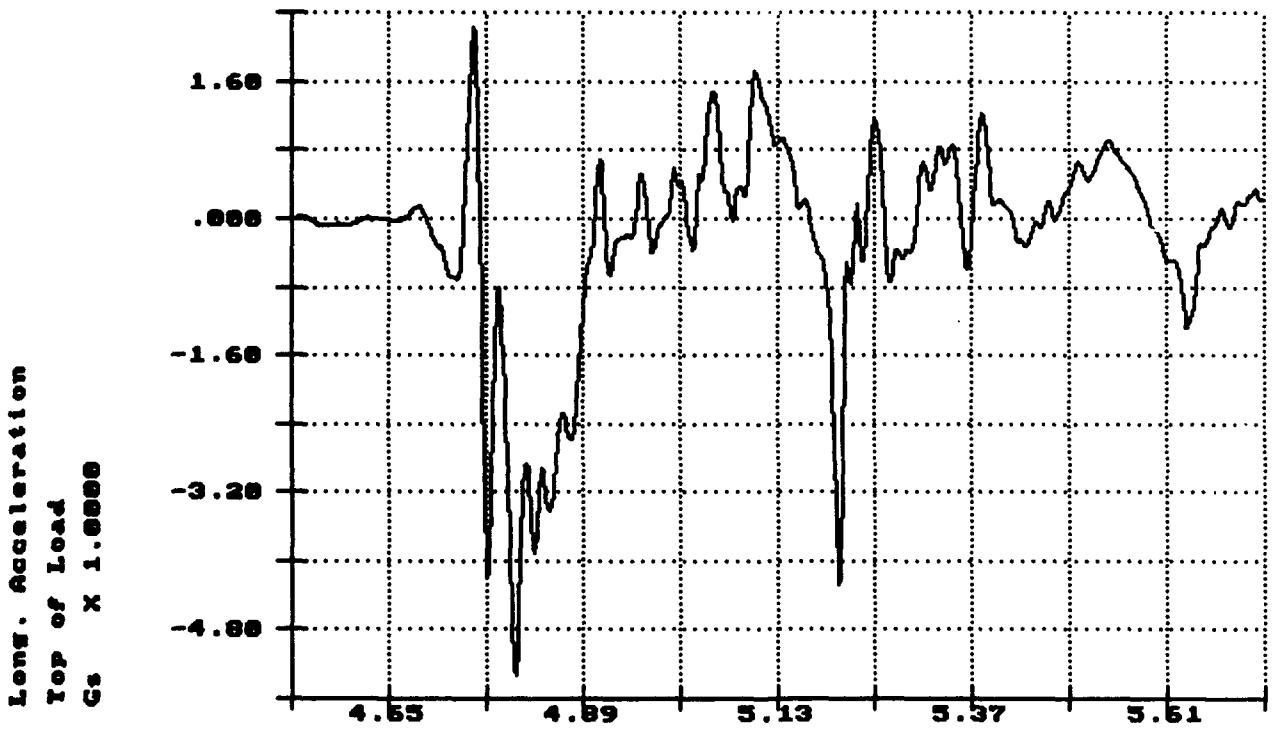
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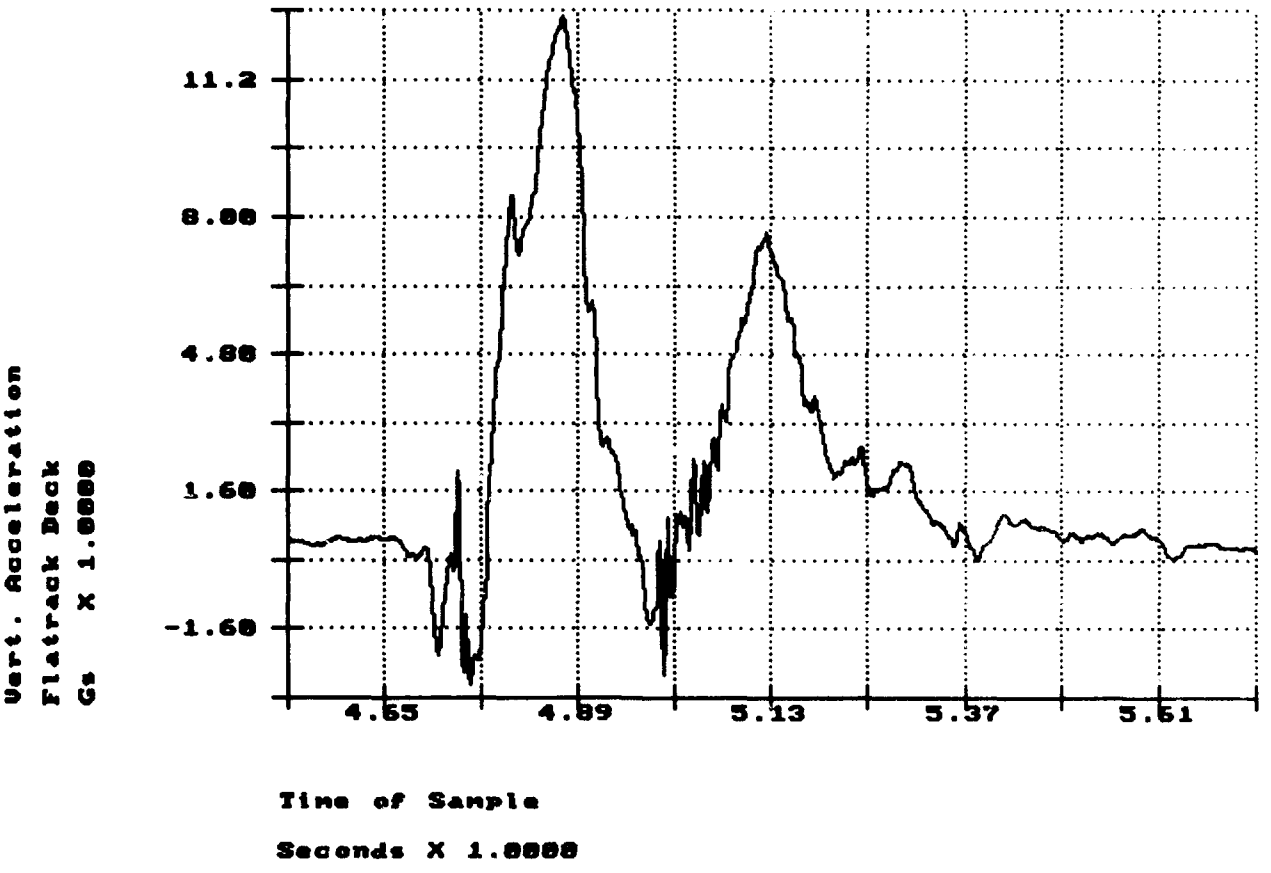
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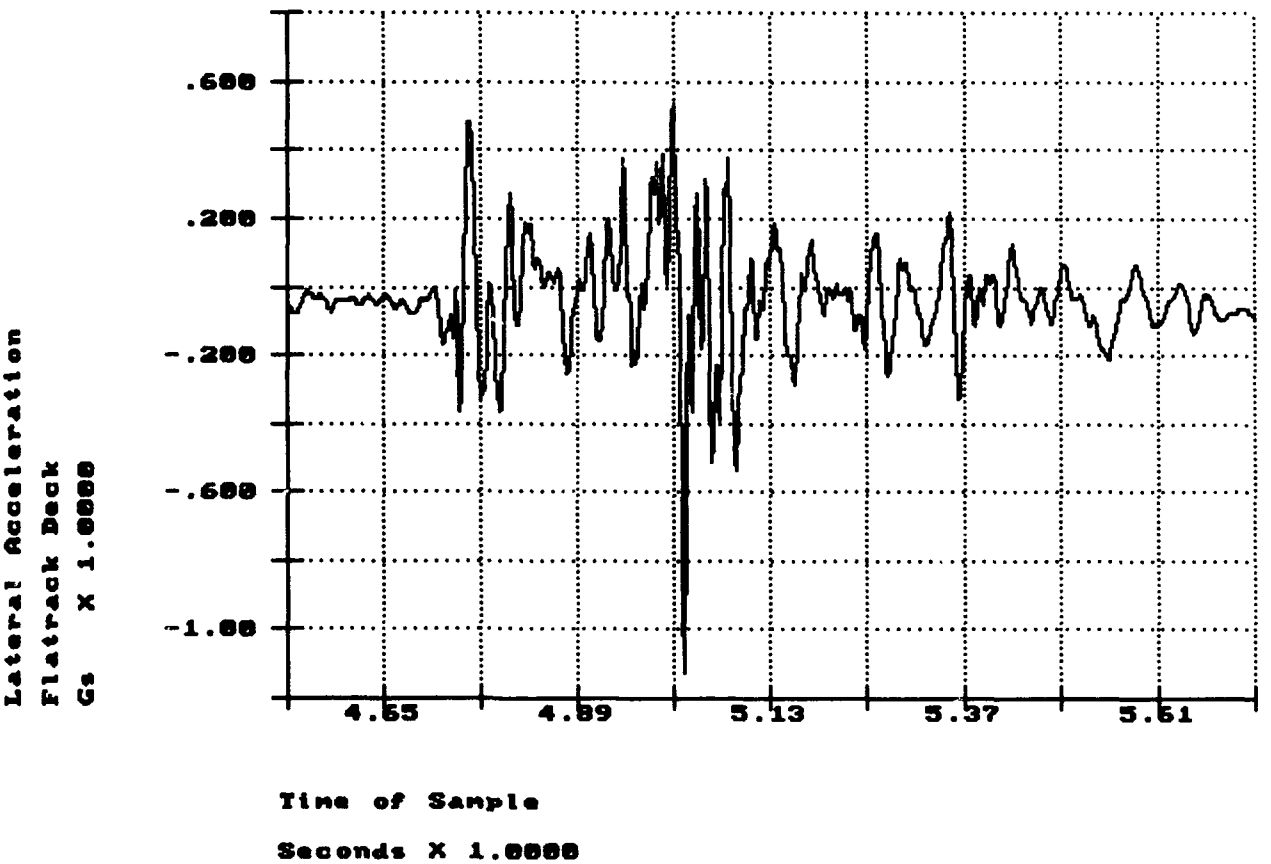
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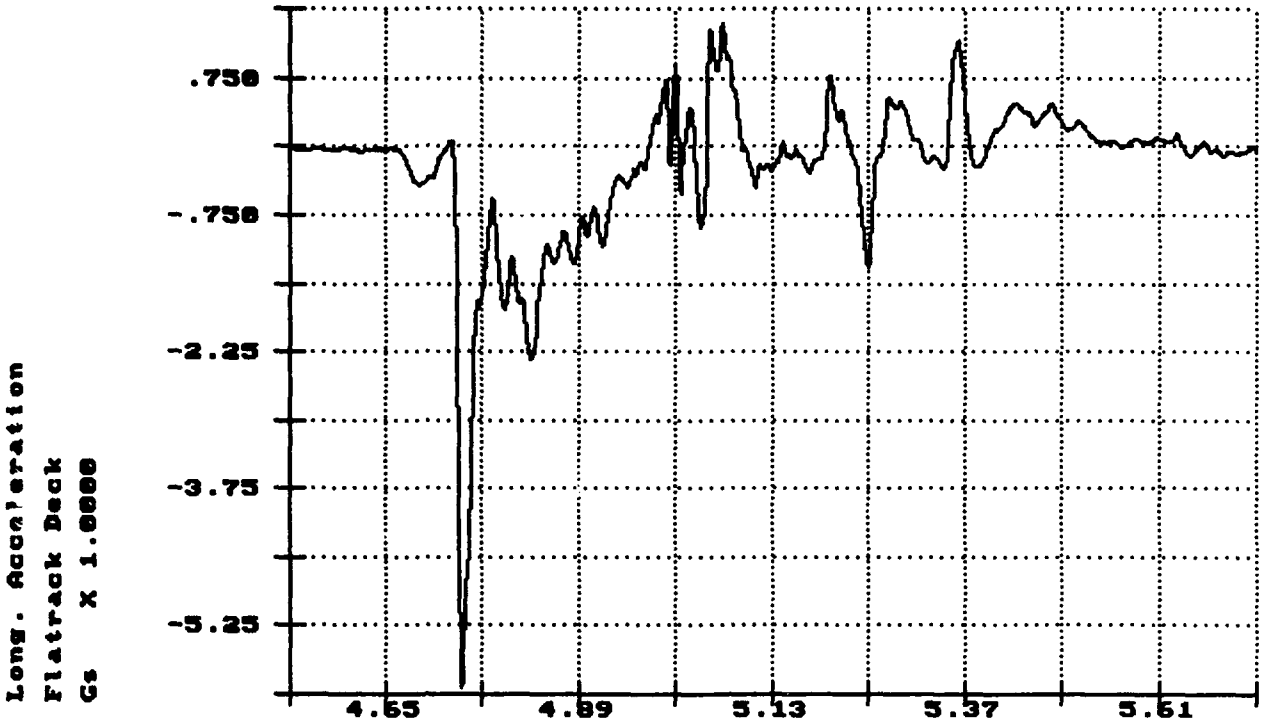
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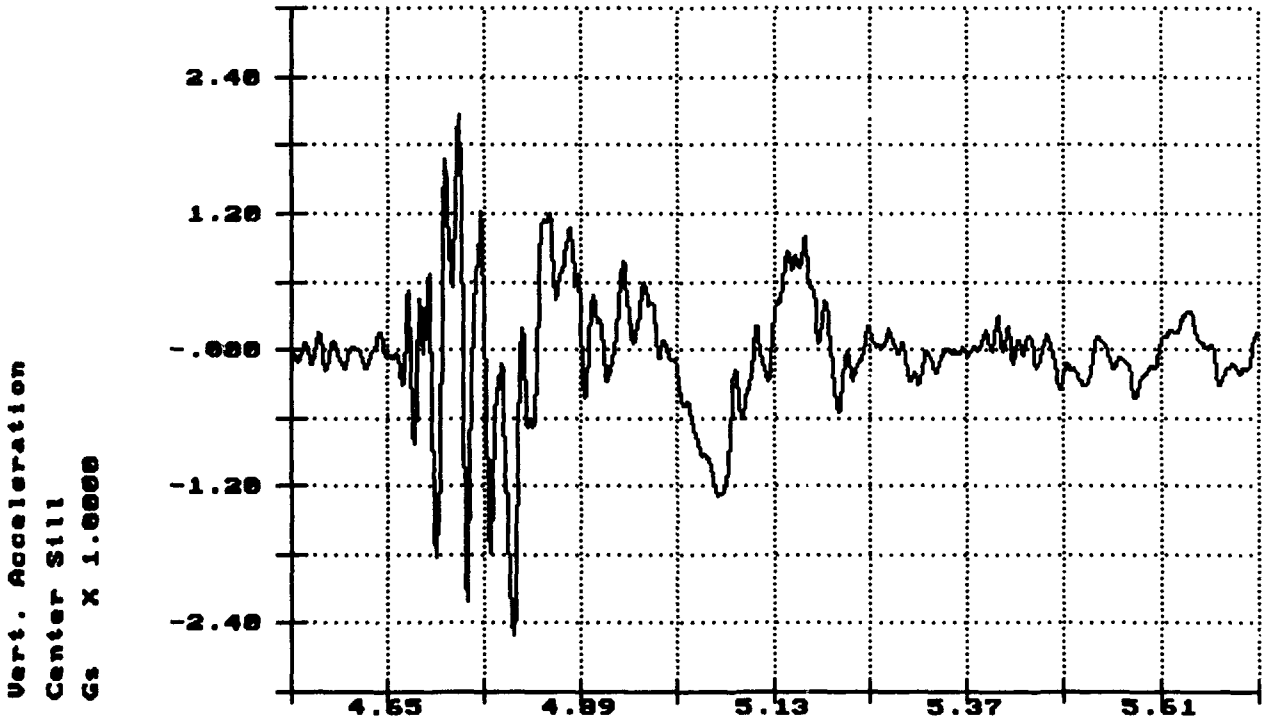
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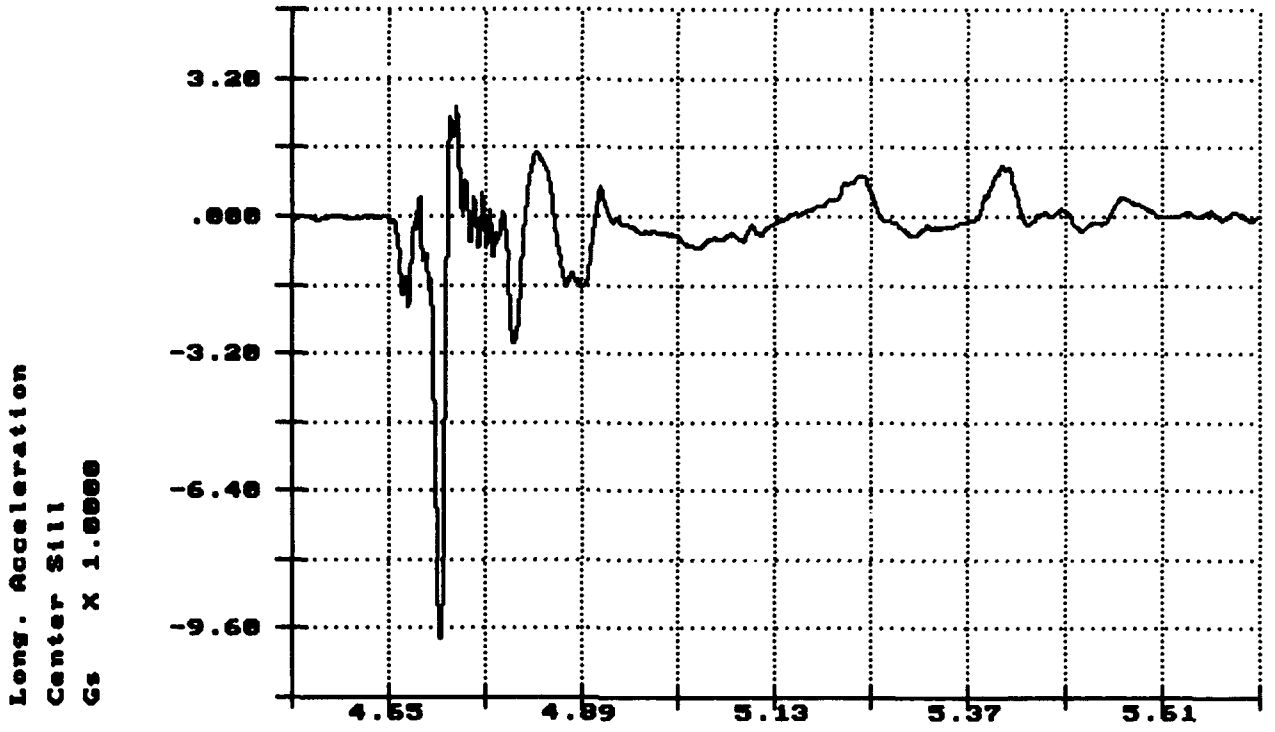
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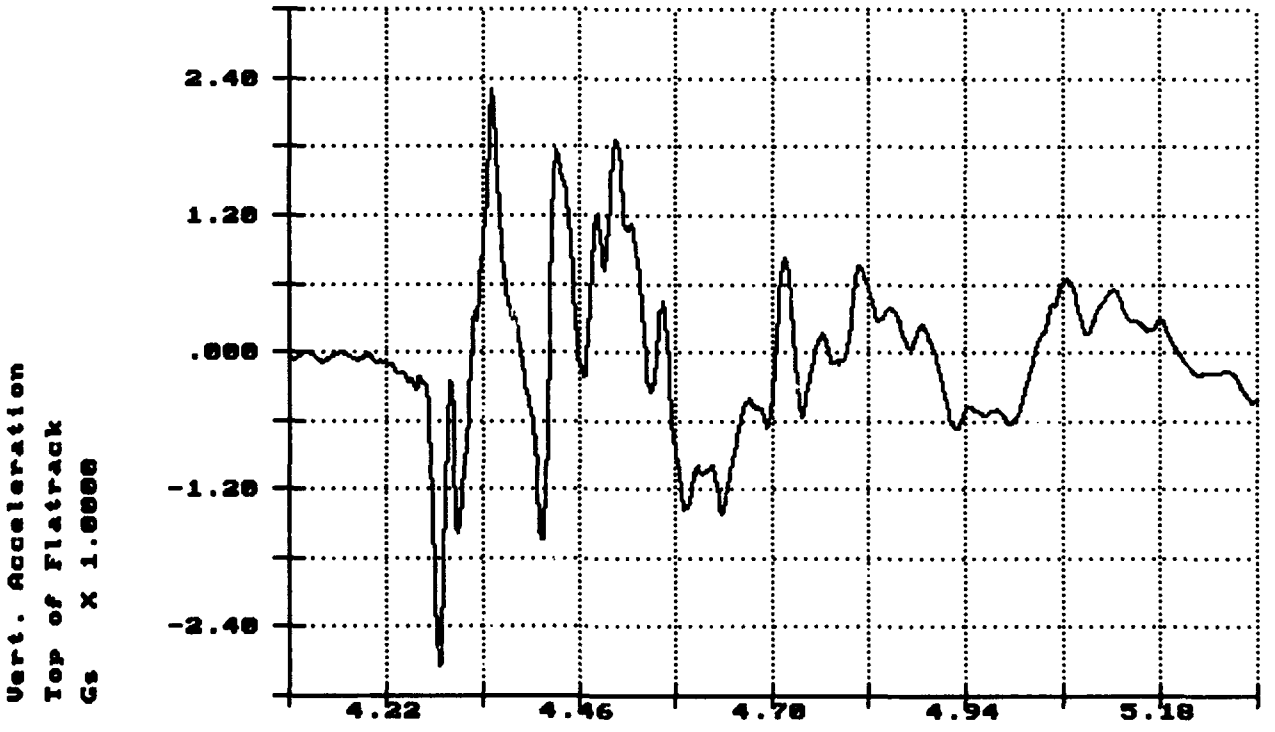
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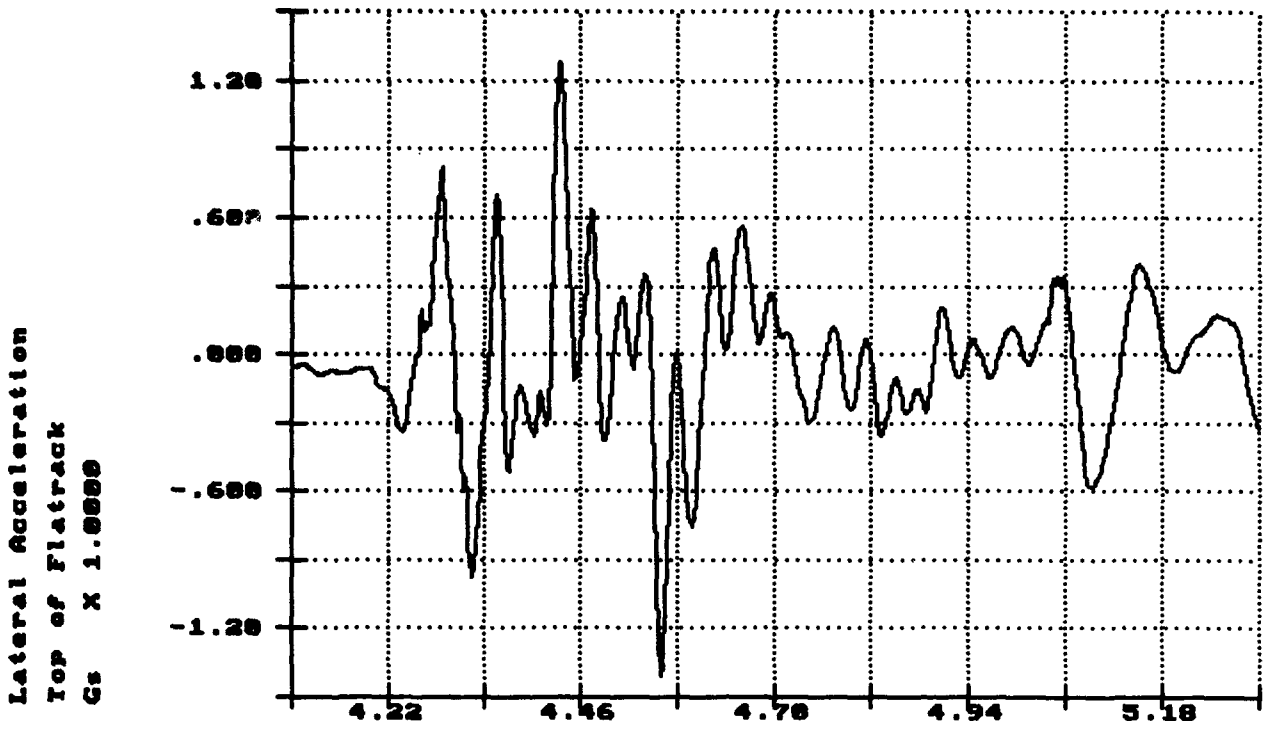
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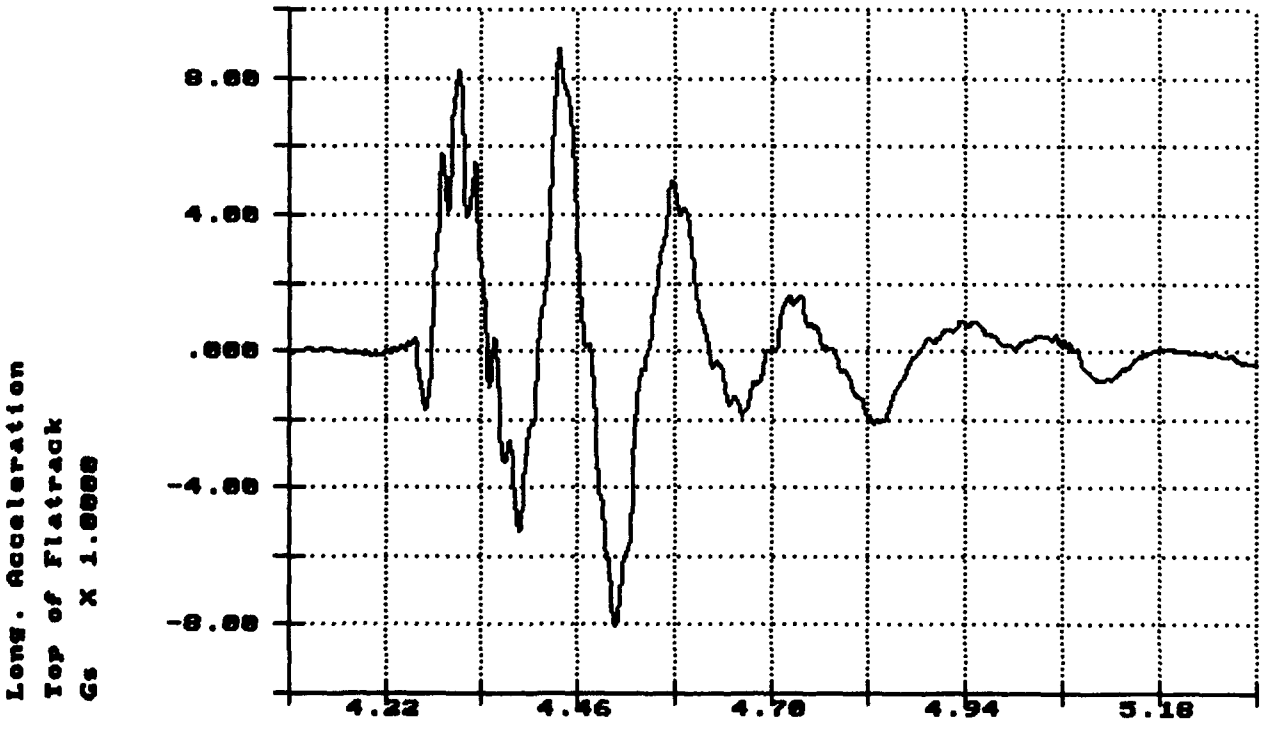
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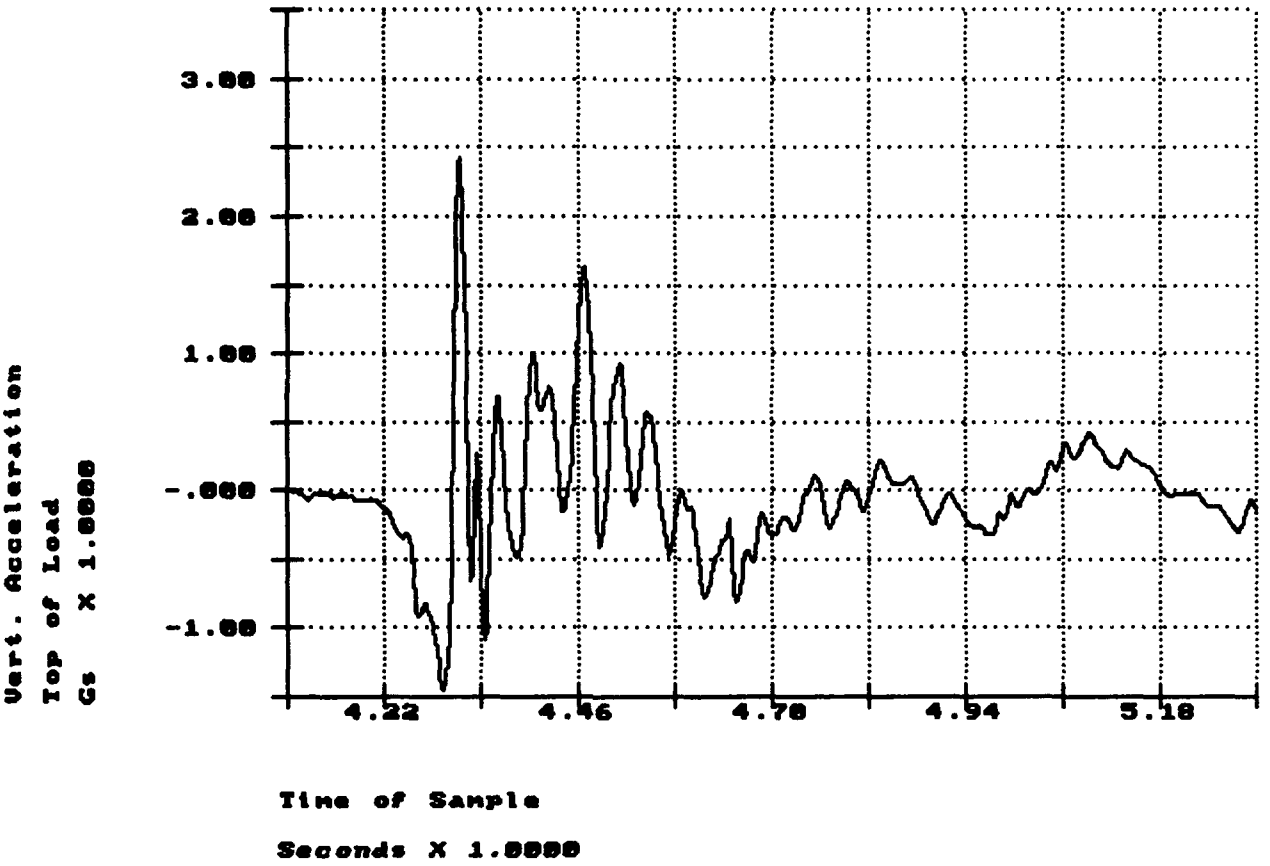
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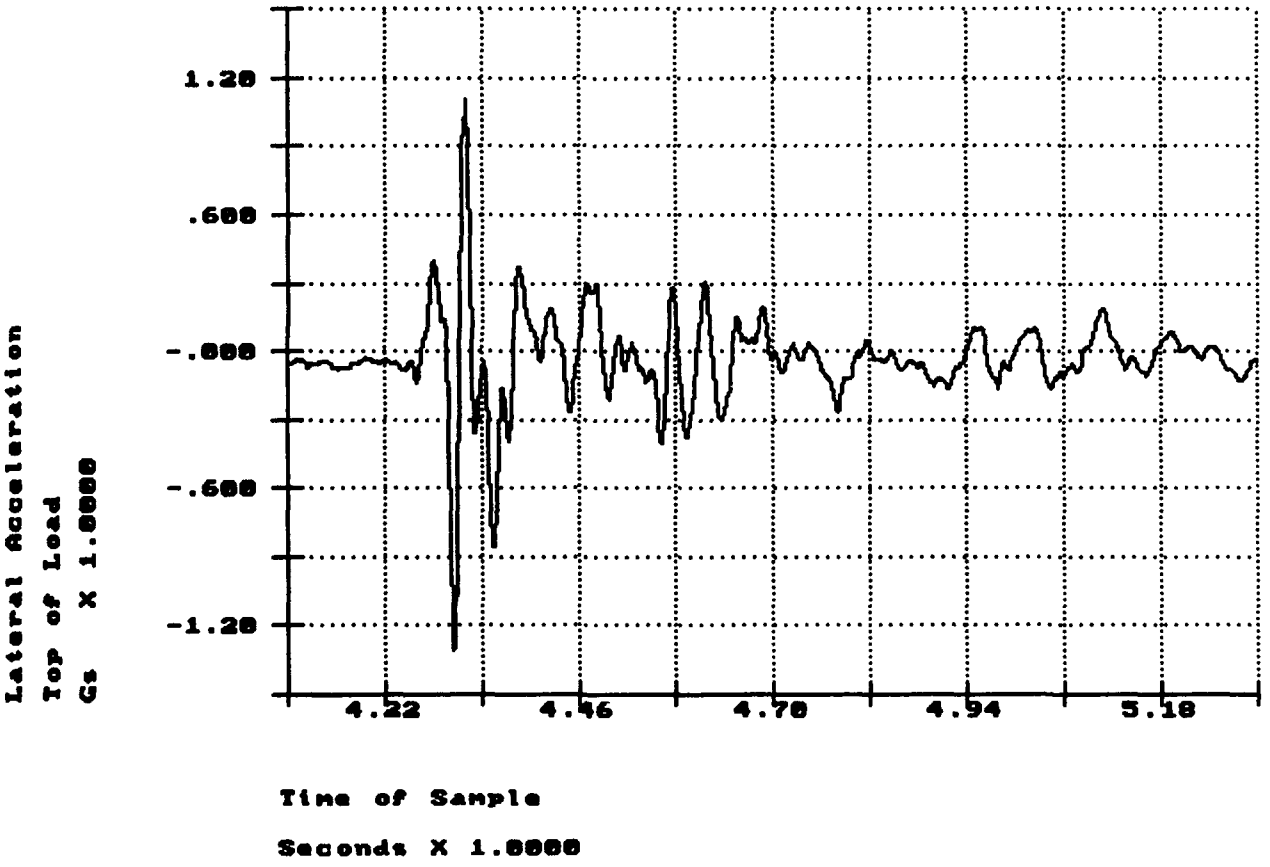
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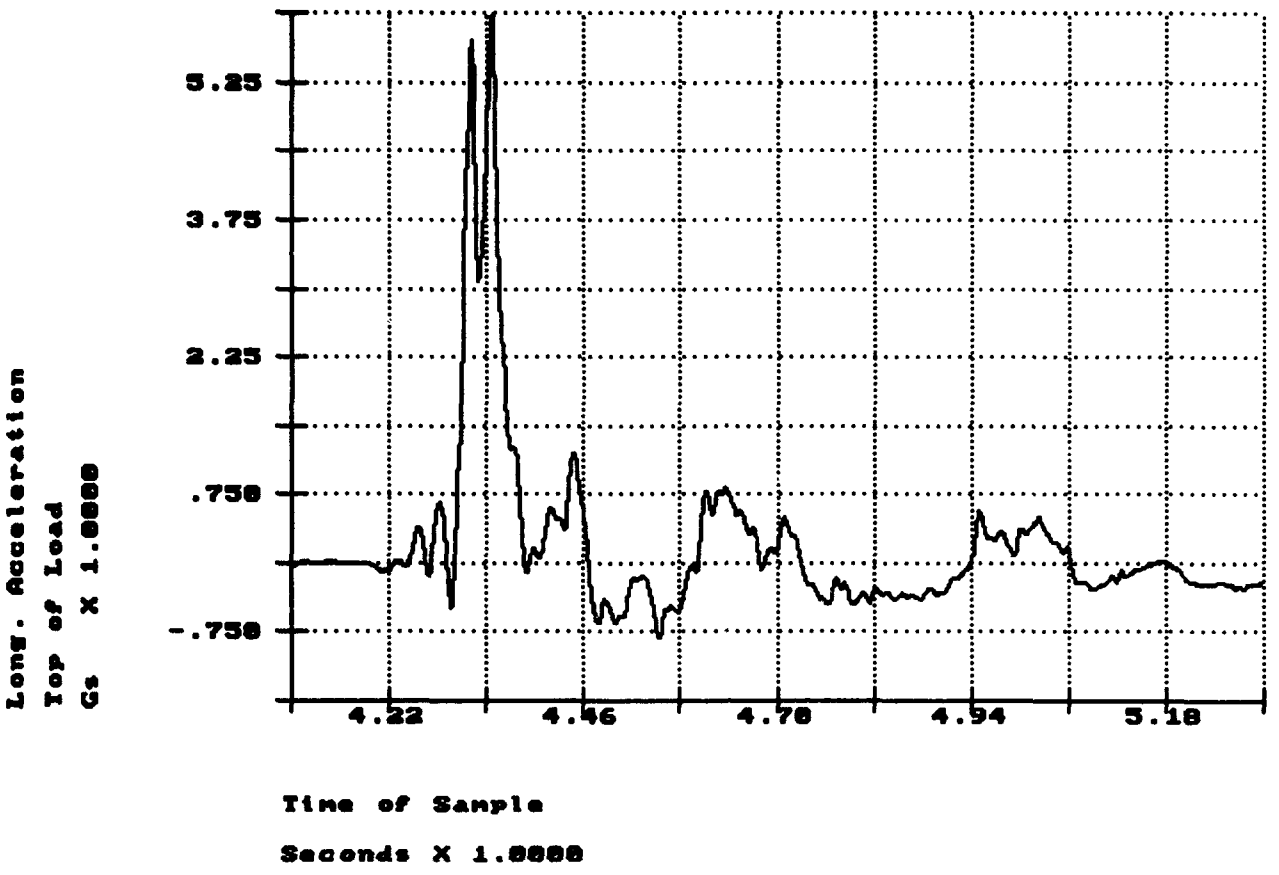
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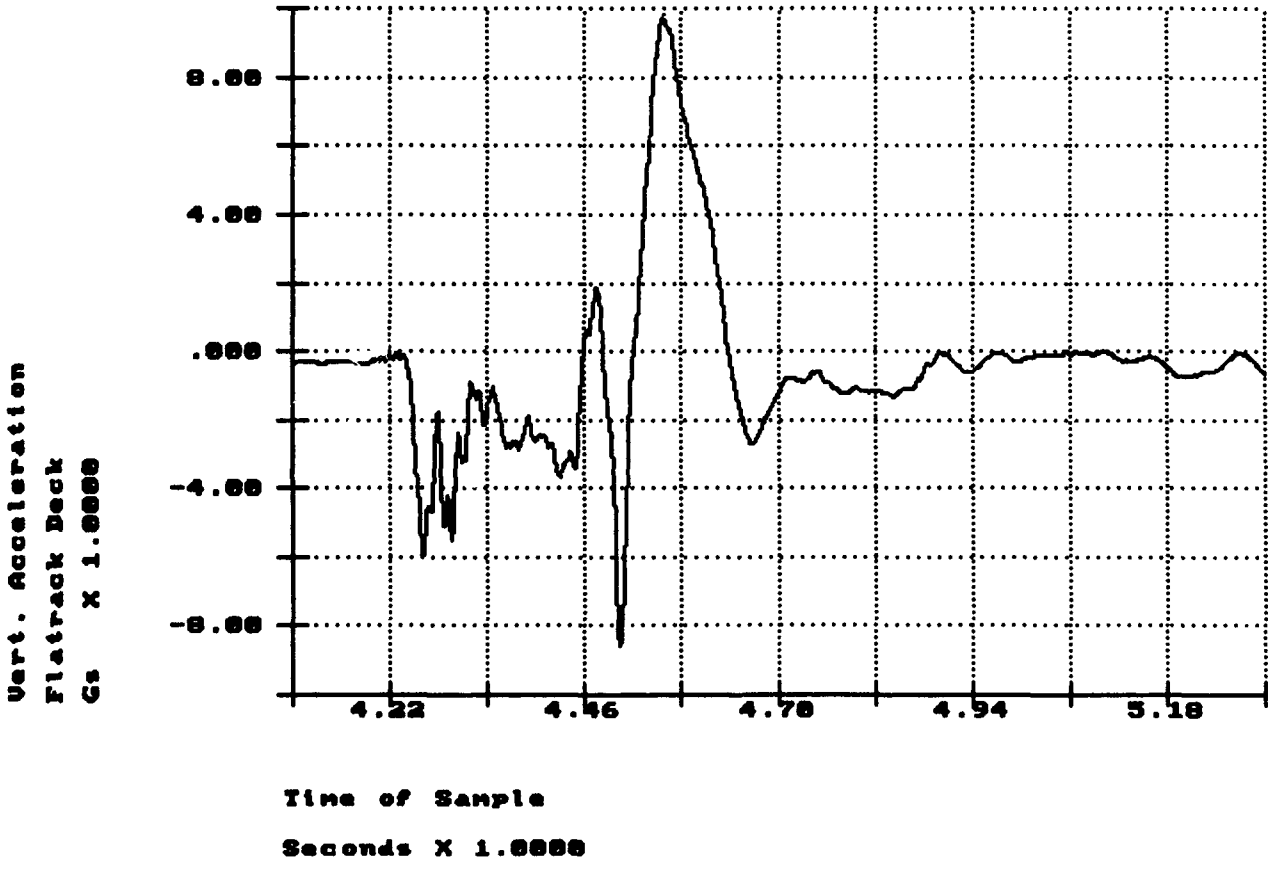
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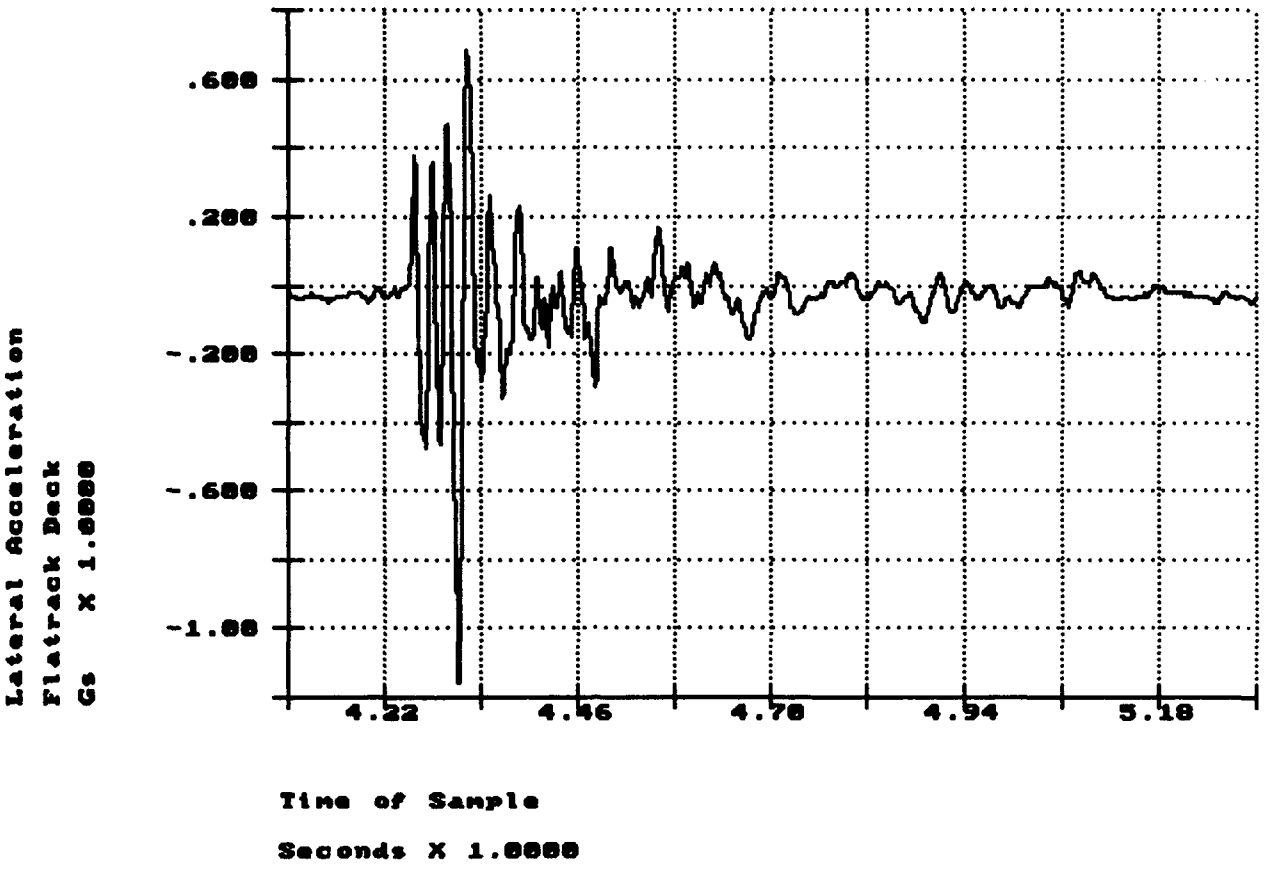
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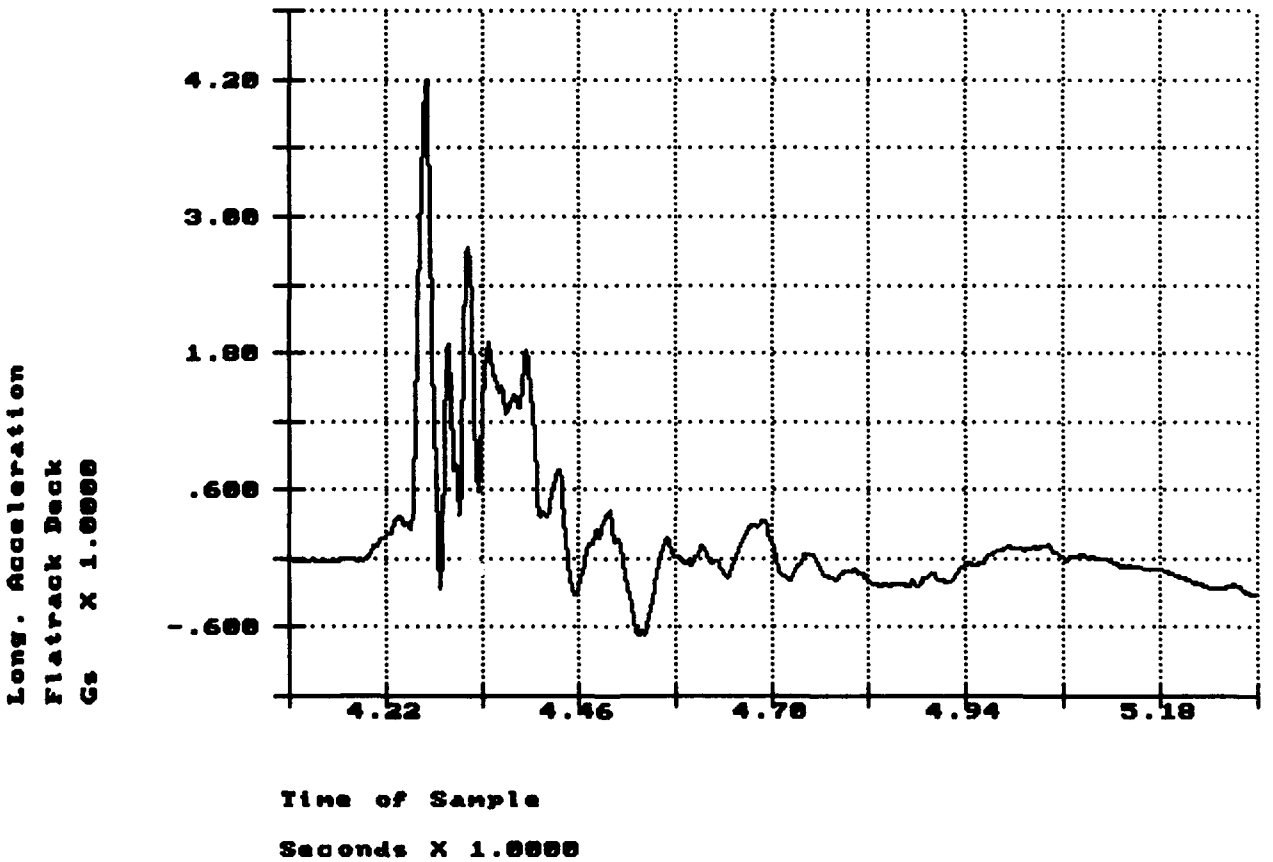
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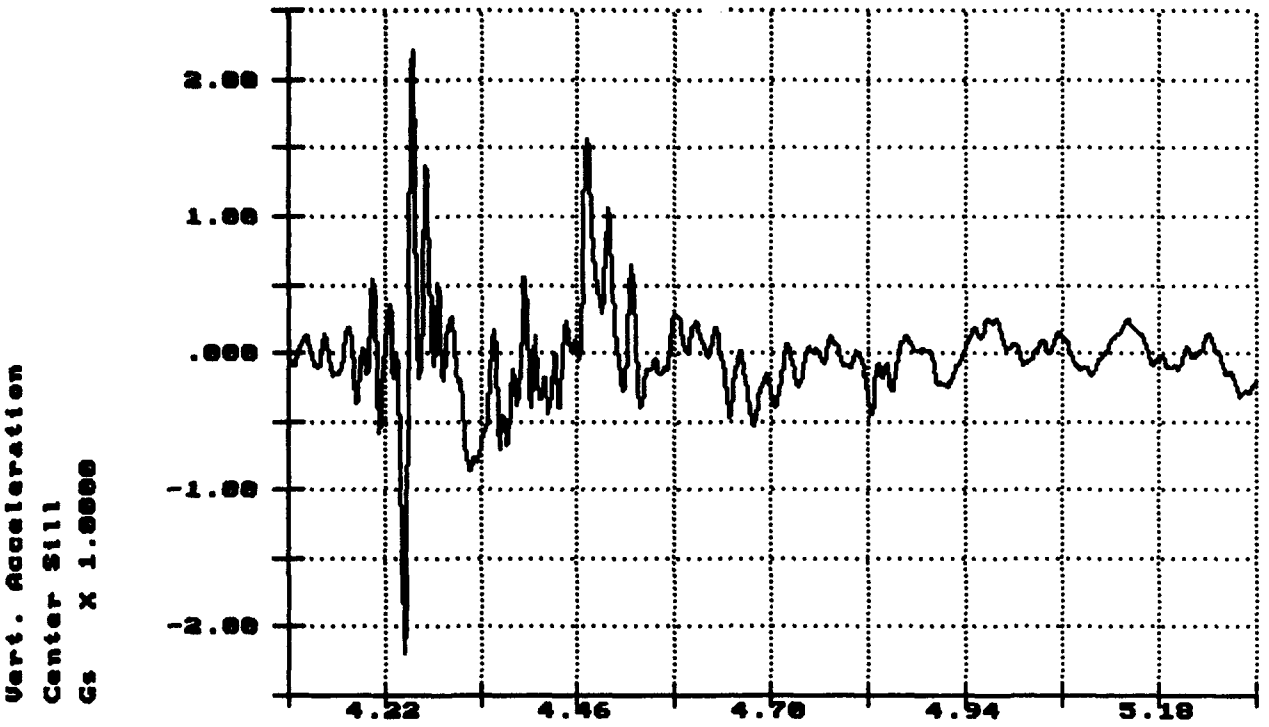
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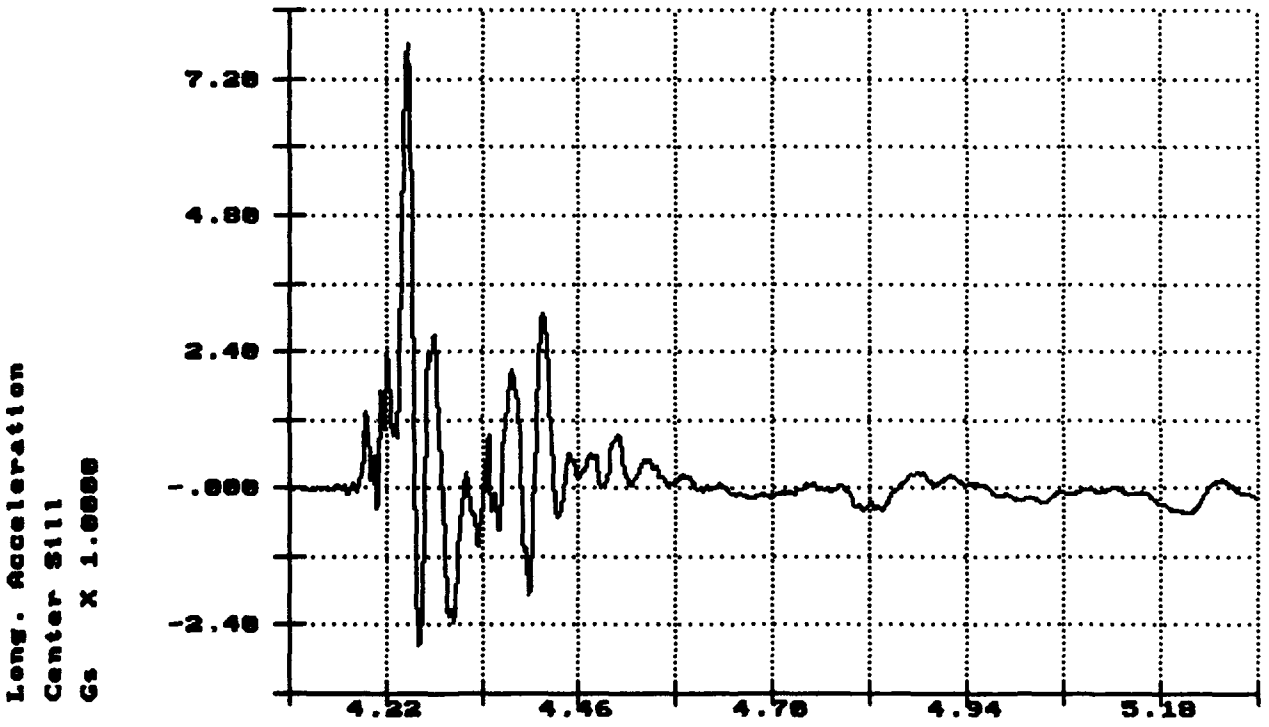
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R.I. of PLS Truck, Impact 4: 8.33 MPH Nov 24 14:06:38 1993



R.I. of PLS Truck, Impact 4: 8.33 MPH Nov 24 14:06:38 1993



TEST NO. 8

RAIL IMPACT DATA

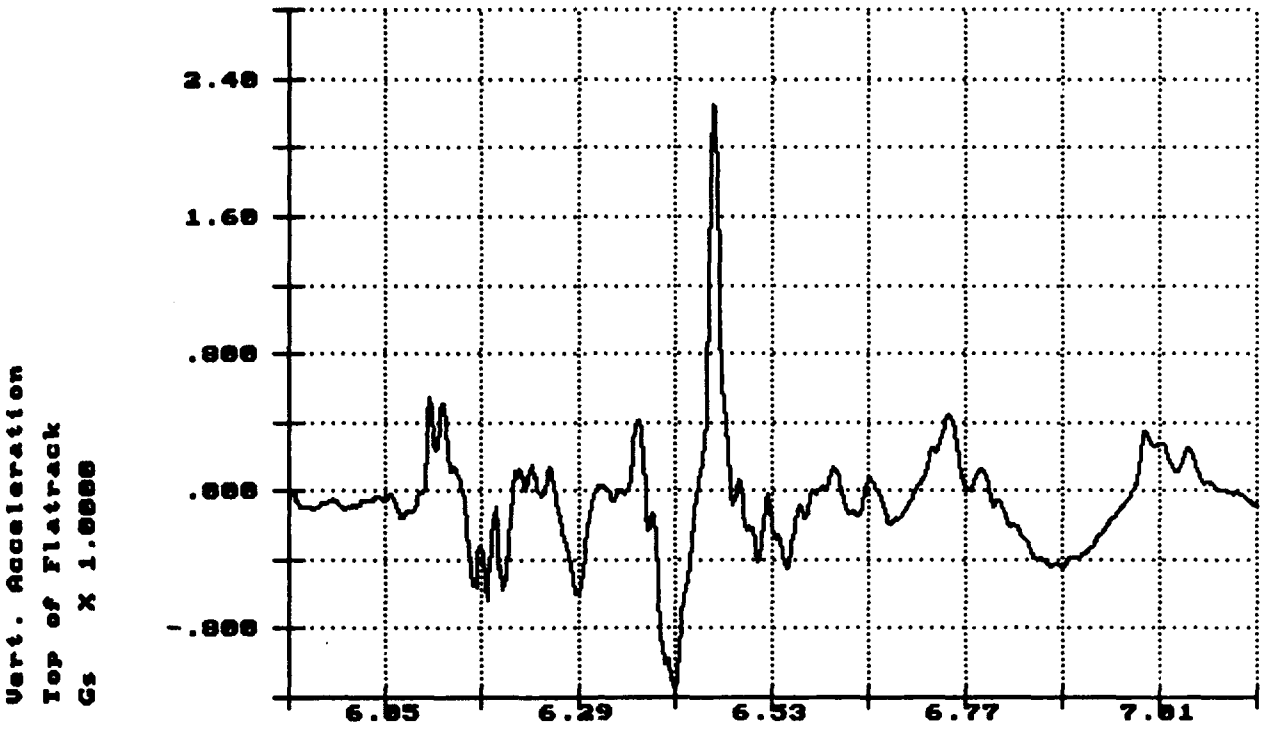
Test No.: 8 **Date: 30 November 1993**

Specimen Load: PLS truck with an EPF loaded with 120MM tank ammunition on metal pallets.

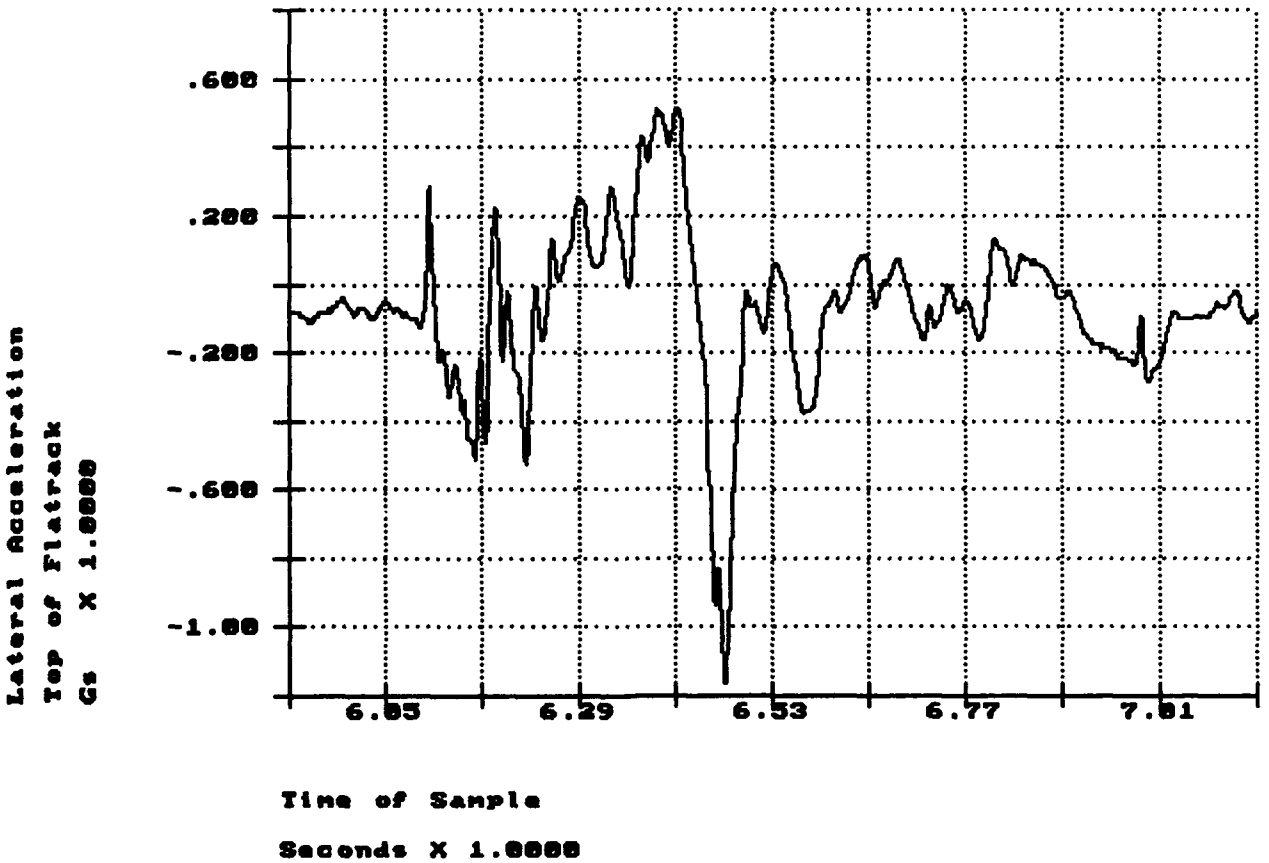
Flatcar No.: EJ&E 6001	**Lt. Wt.: 57,200**
PLS Truck	**Wt.: 54,750**
EPF No. 2	**Wt.: 7,500**
Lading, 120MM Tank Ammunition on Metal Pallets	**Wt.: 24,000**
	Total Specimen Wt.: 143,450
	Buffer Car (five cars) Wt: 250,000

Impact	End Struck	Velocity	Remarks
1	Rear	4.29	Bail bar end wall not vertical in relation to load. Pulled forward by hook. 2-inch gap in pallets at top and 1-inch gap at bottom.
2	Rear	6.36	Gaps unchanged. Metal banding on front of load angled approximately 5 degrees to the rear of the EPF.
3	Rear	8.33	Load rebounded. 1-inch gap at rear and 1/2-inch gap at front. Metal banding is straight.
4	Forward	8.82	Load shifted 1/2-inch toward the front. No damage observed to load, vehicle, or vehicle tie-downs.

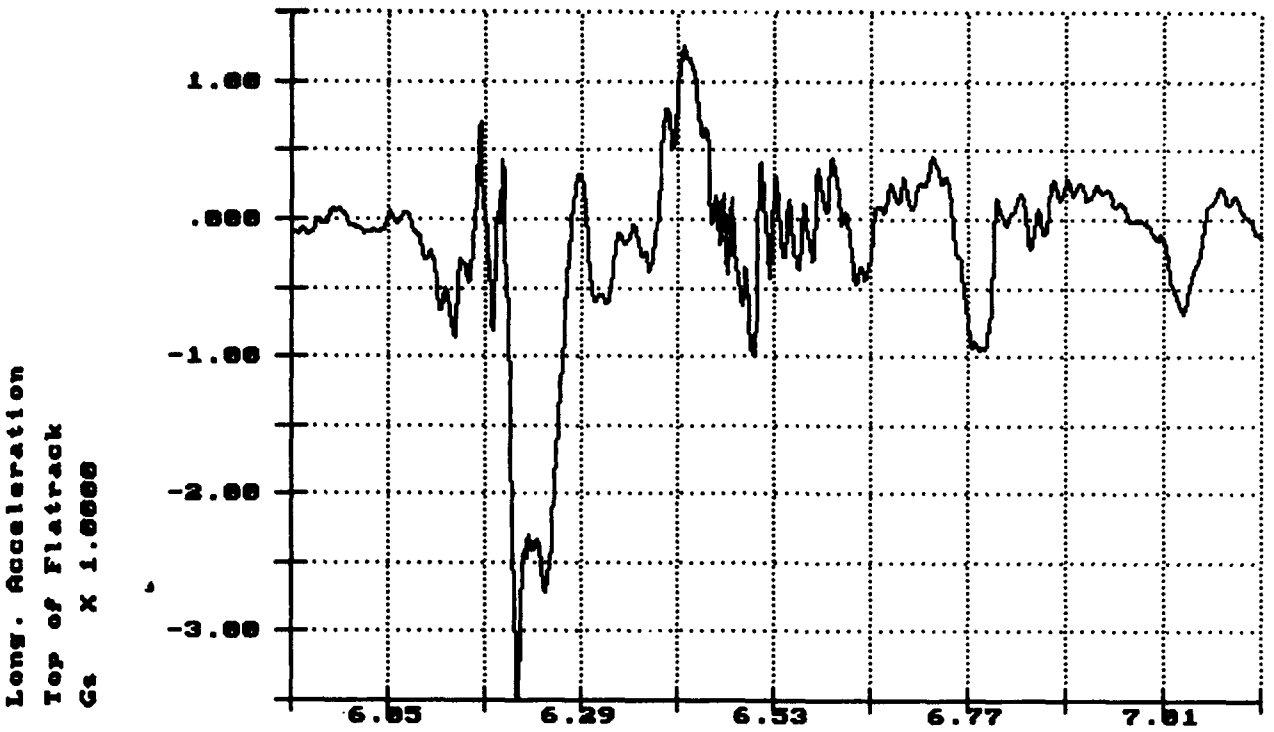
R.I. of PLS Truck, Impact 1: 4.29 MPH Nov 30 10:03:12 1993



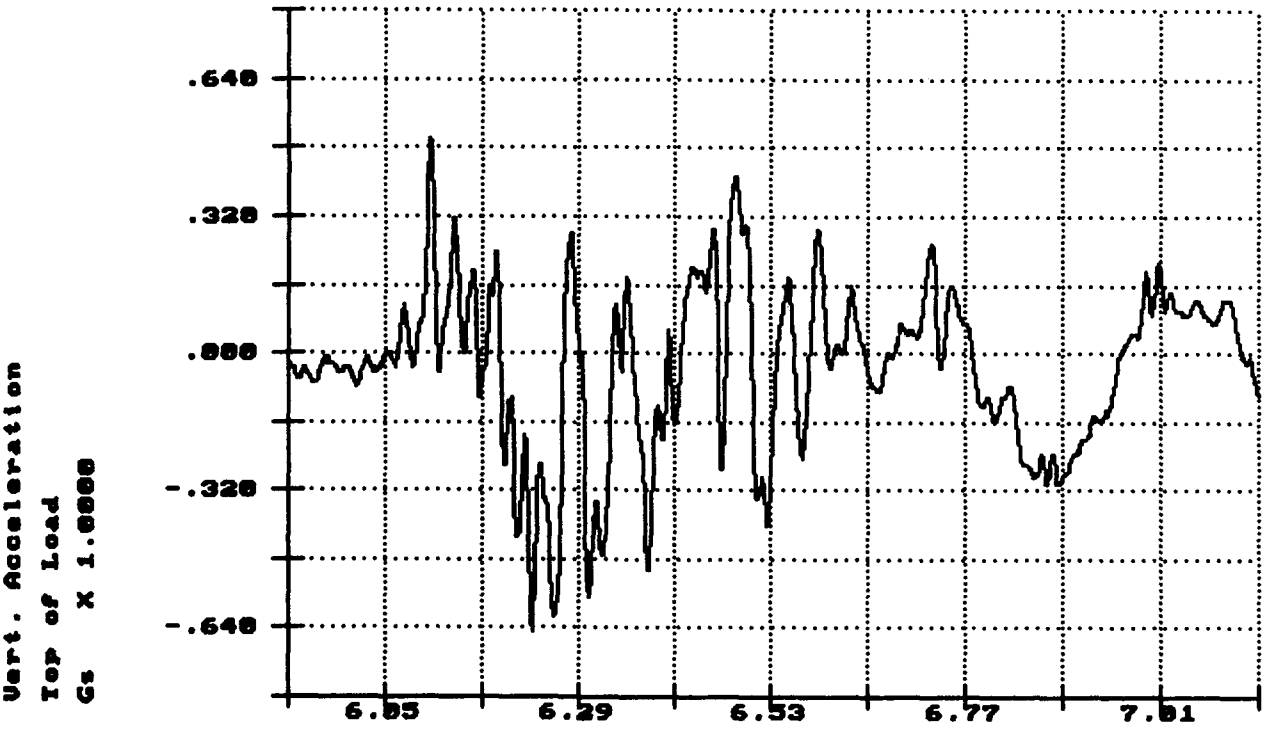
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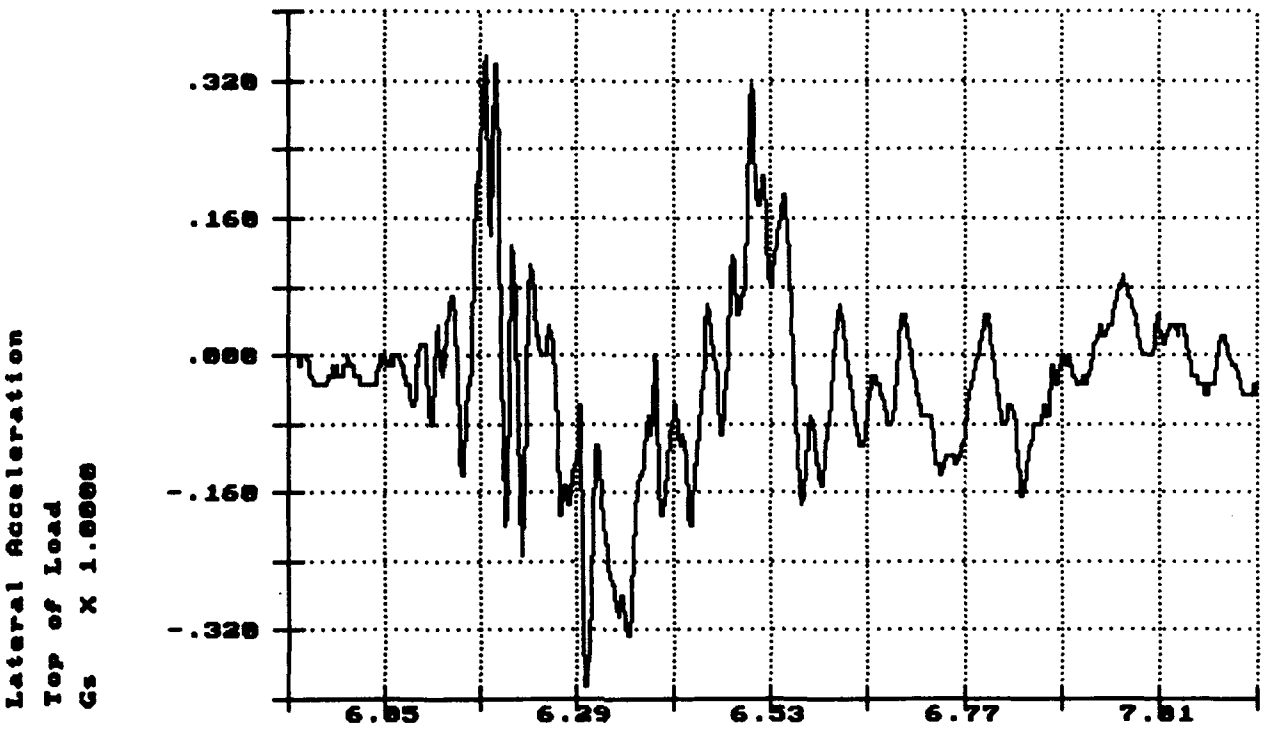
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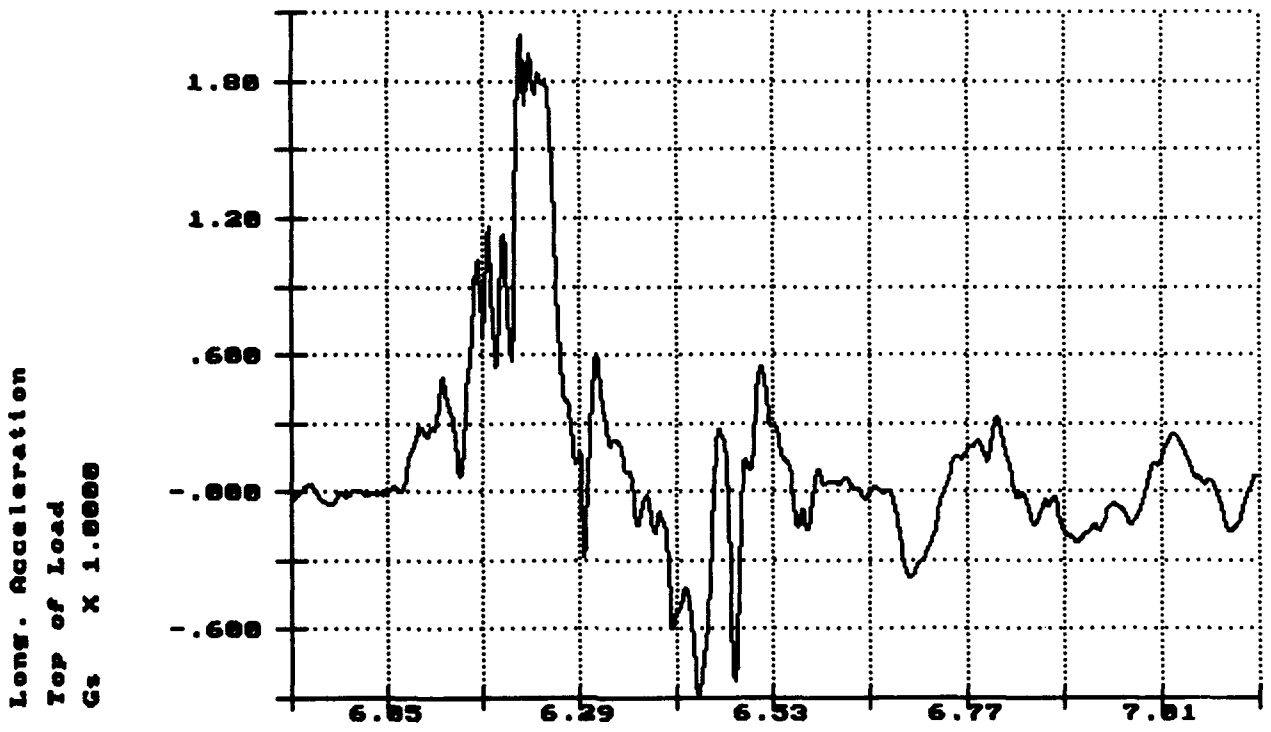
R.I. of PLS Truck, Impact 1: 4.29 MPH Nov 30 10:03:12 1993



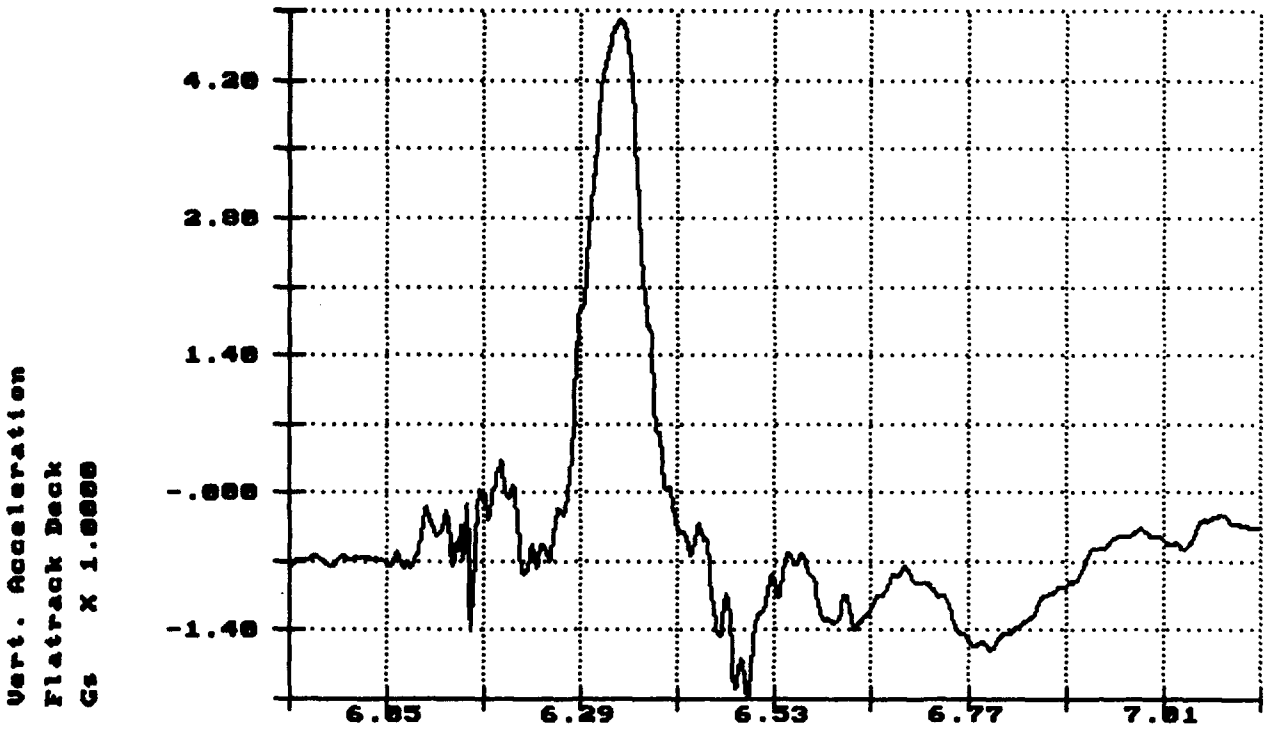
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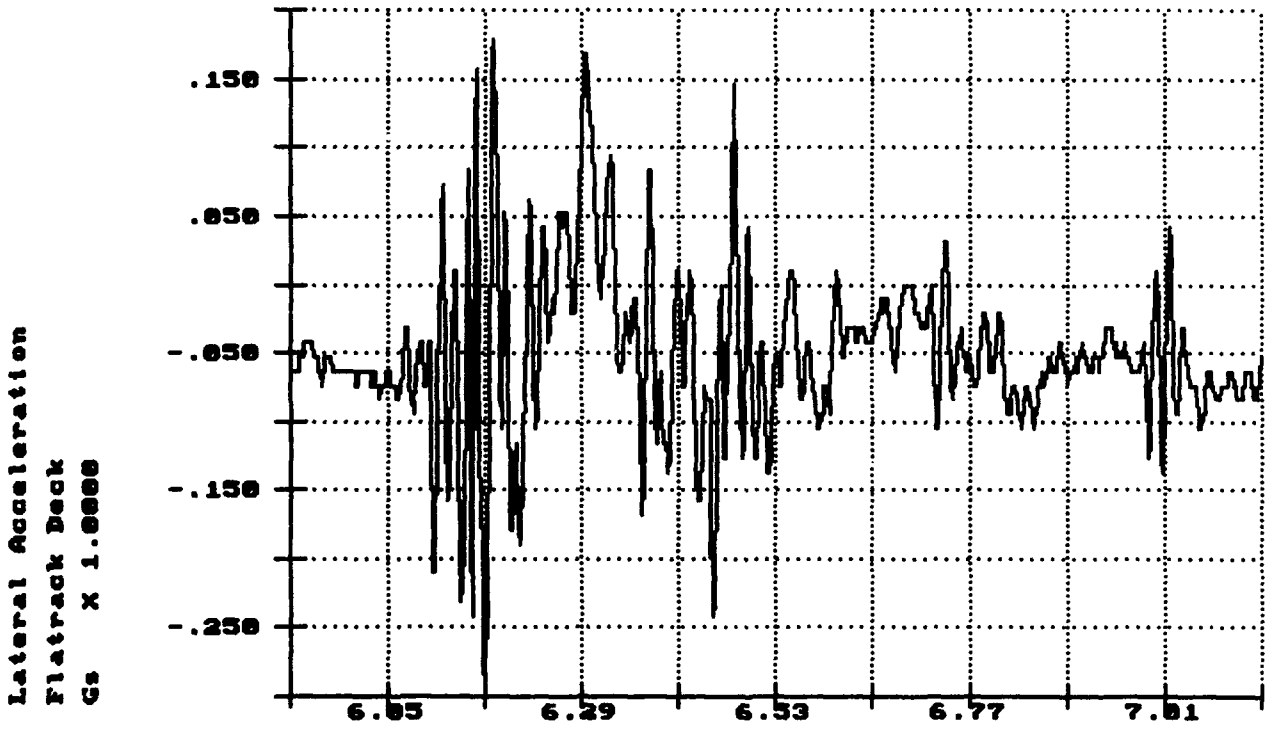
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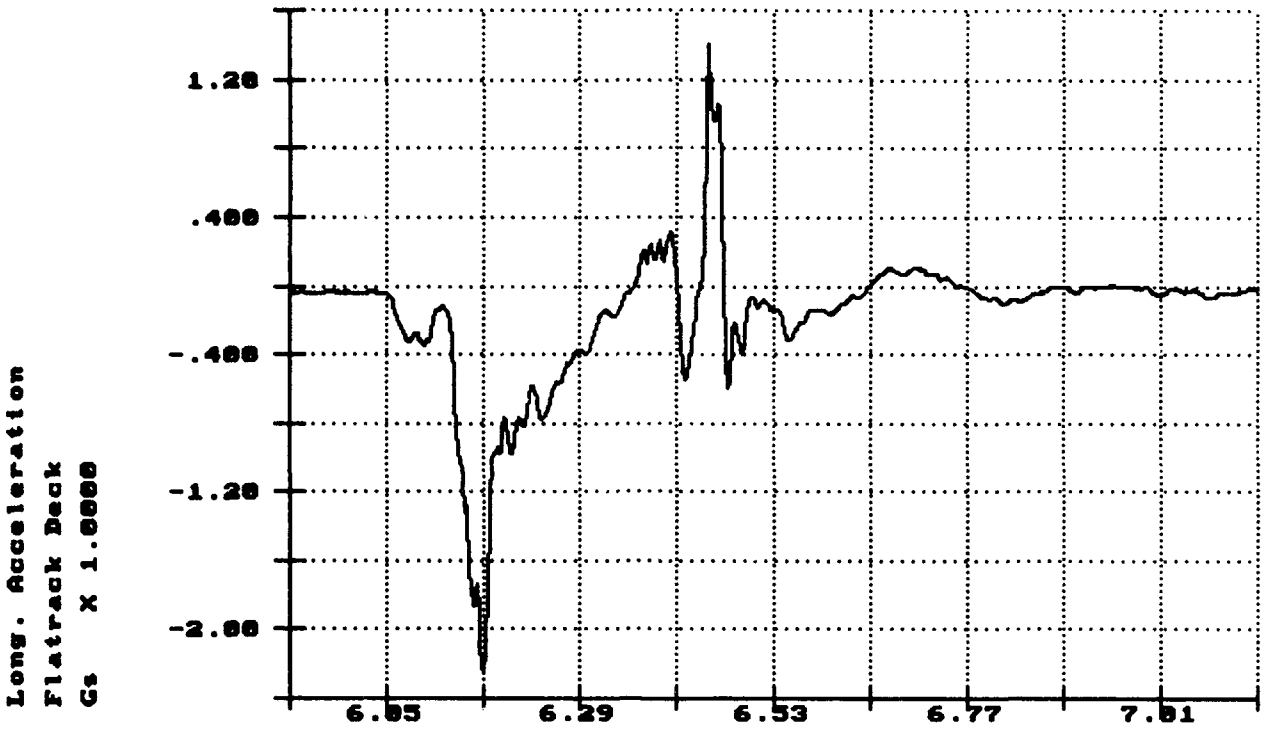
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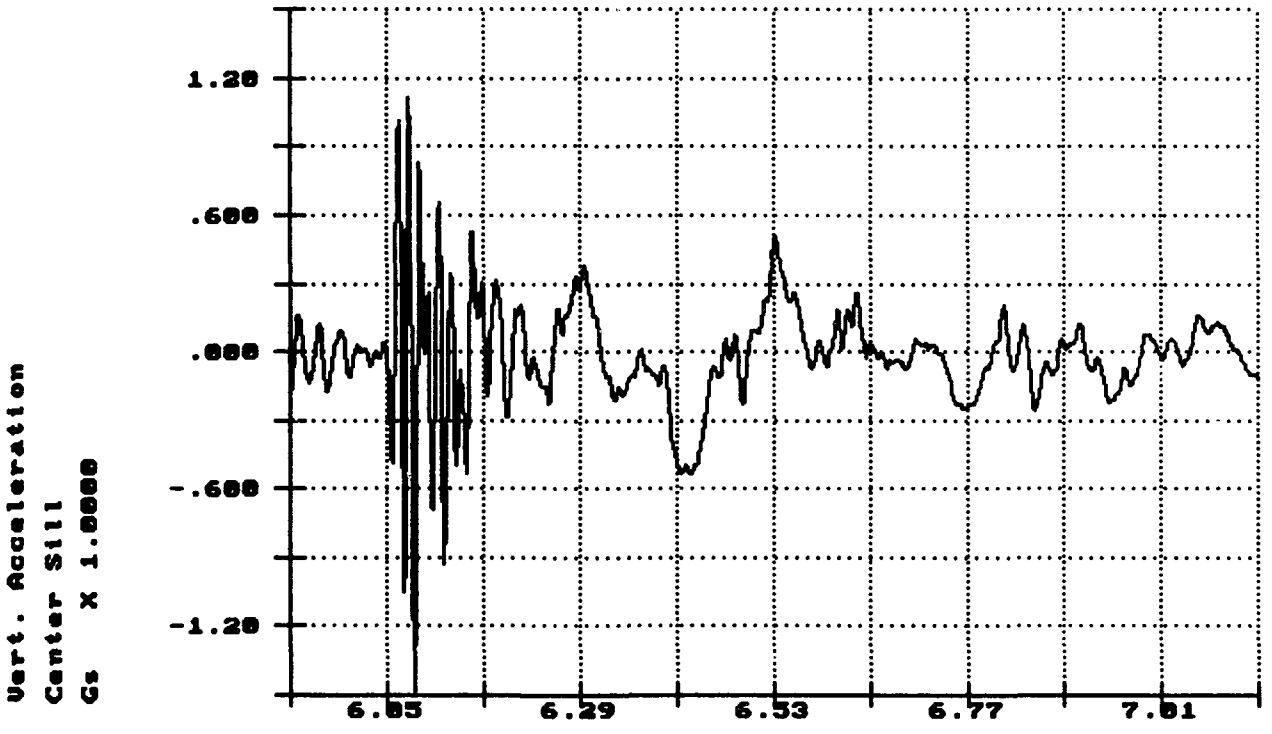
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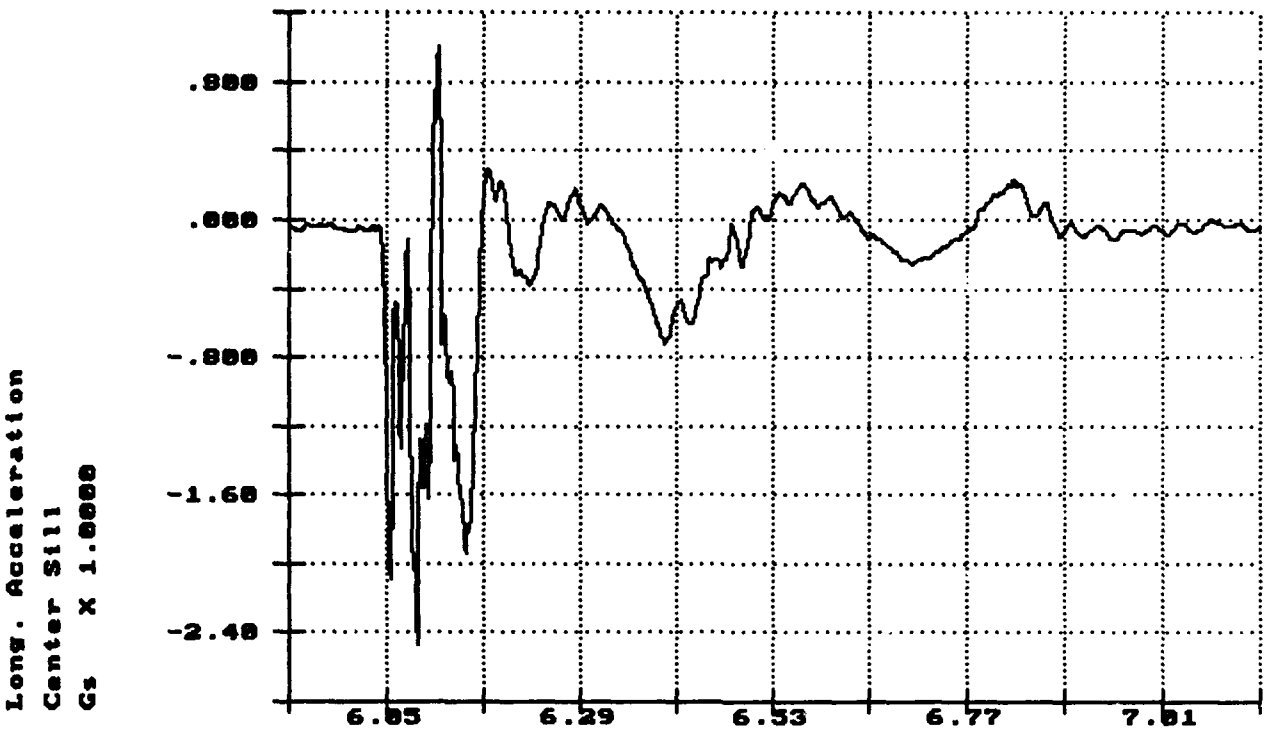
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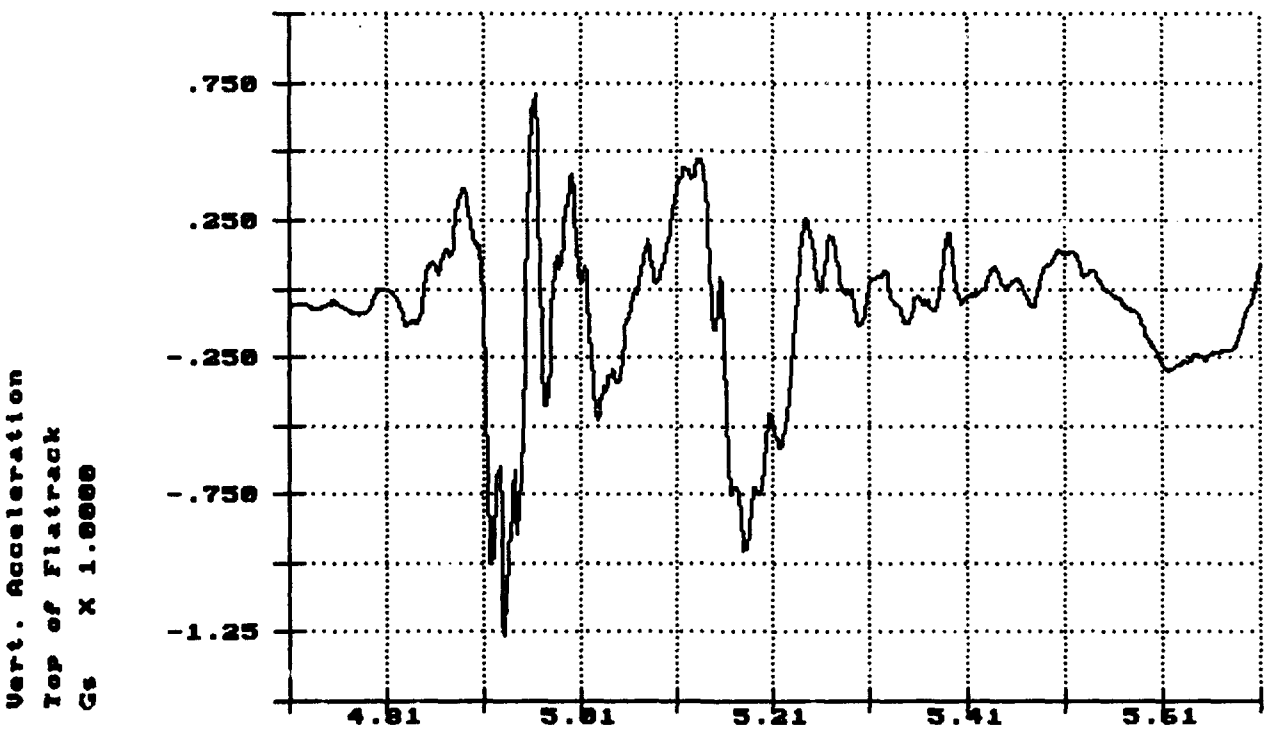
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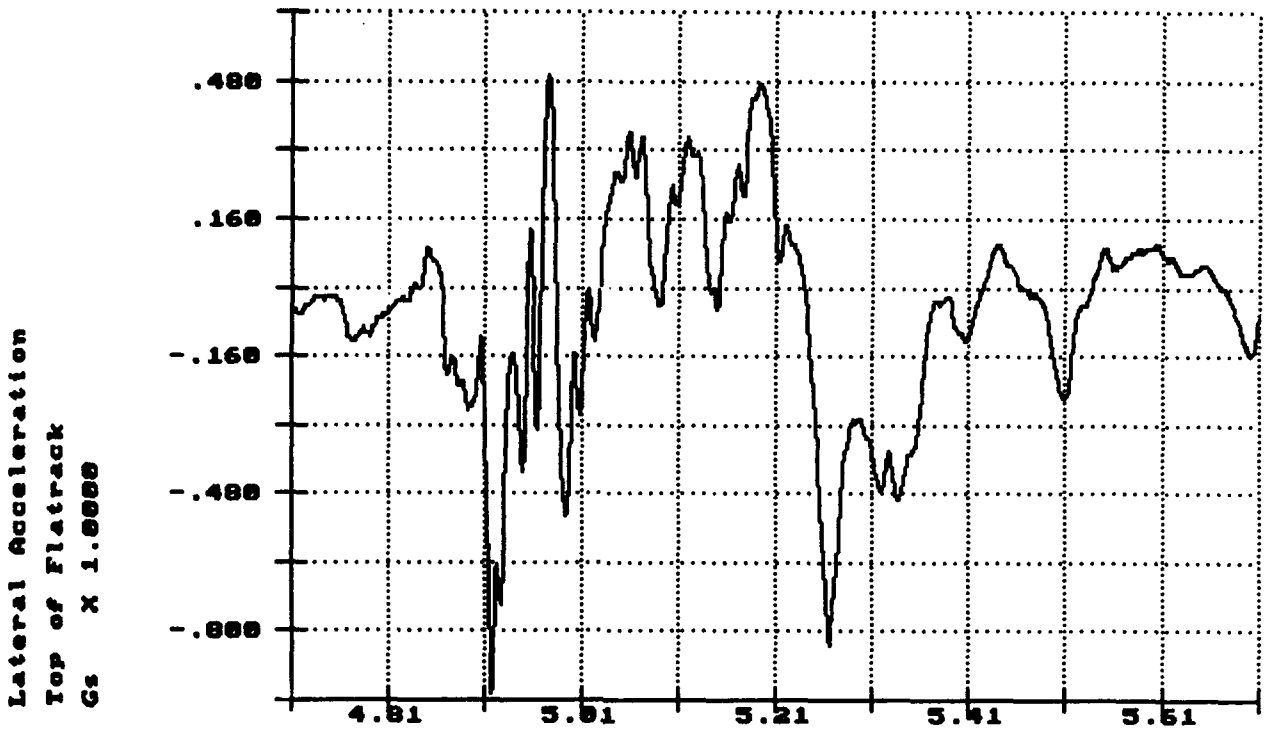
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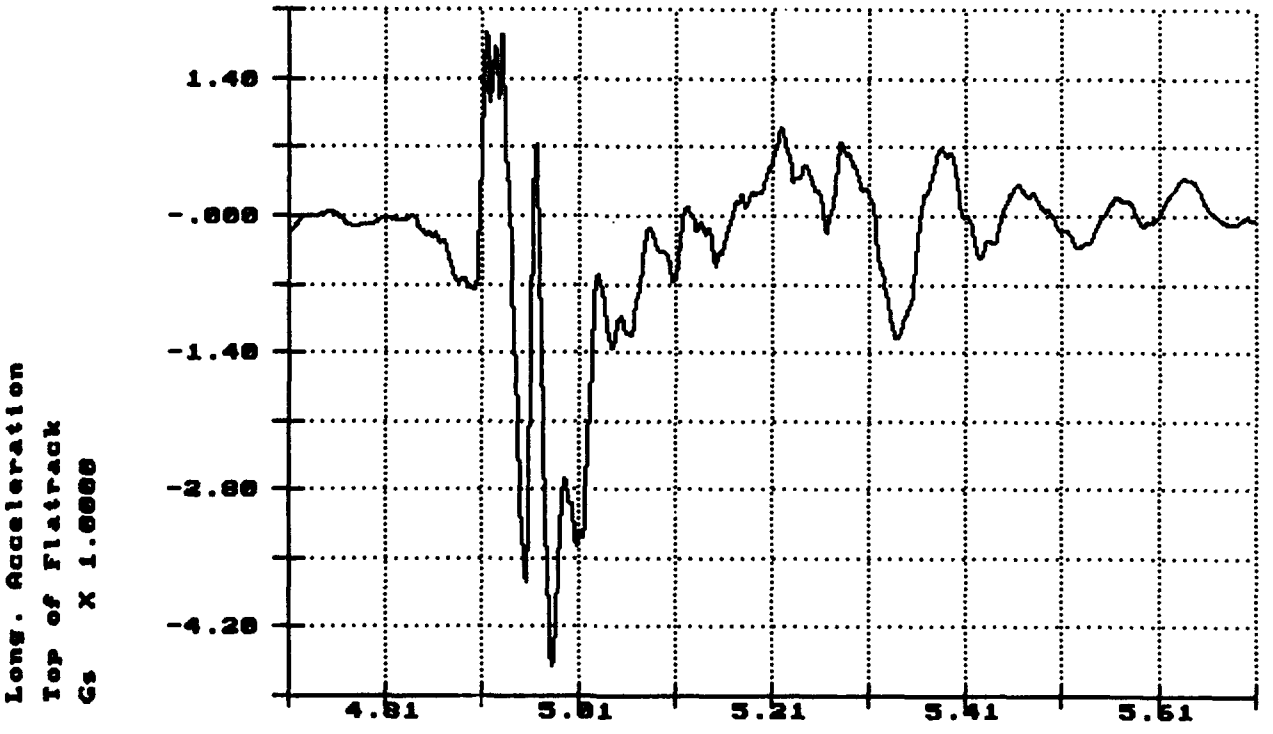
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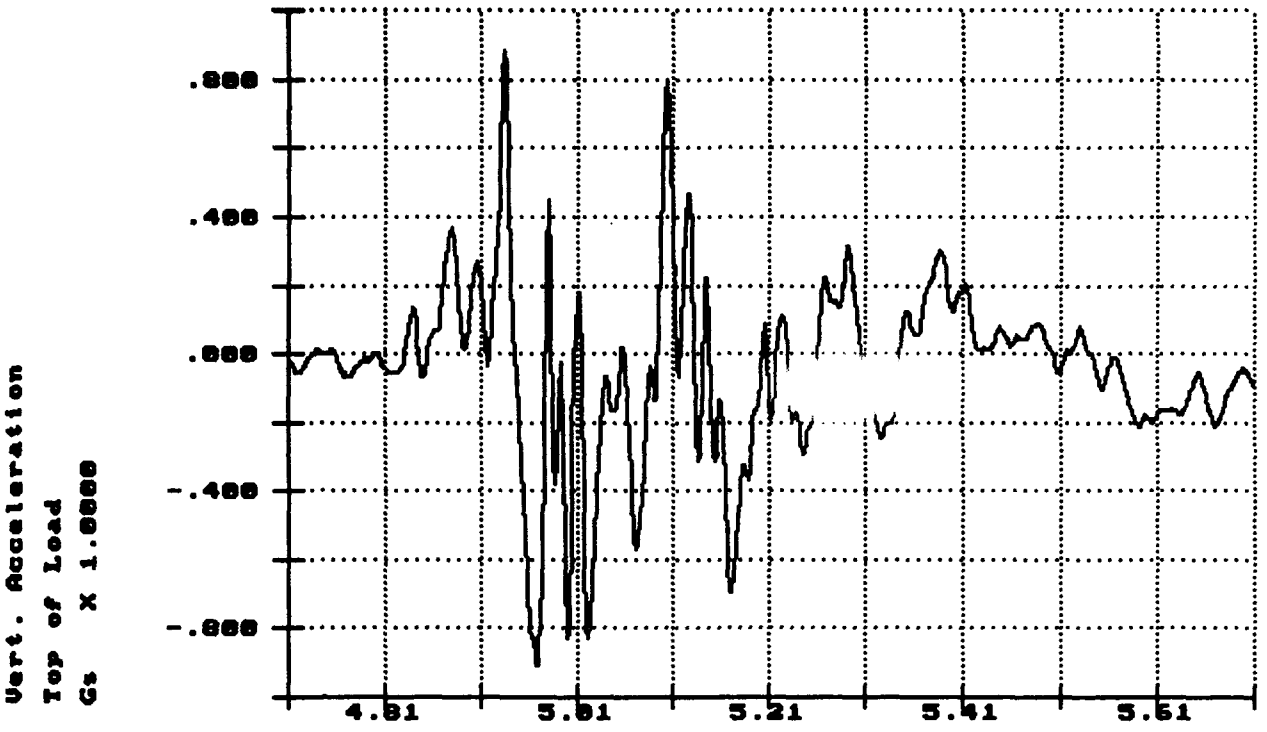
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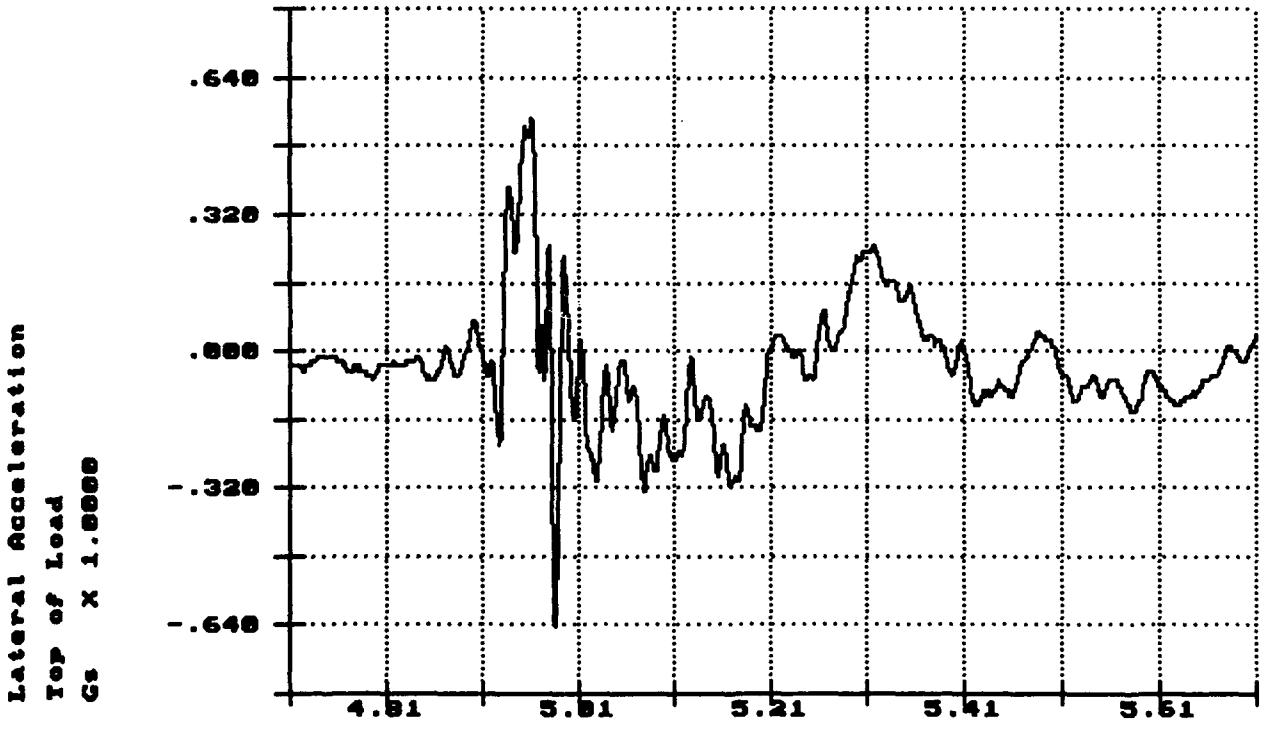
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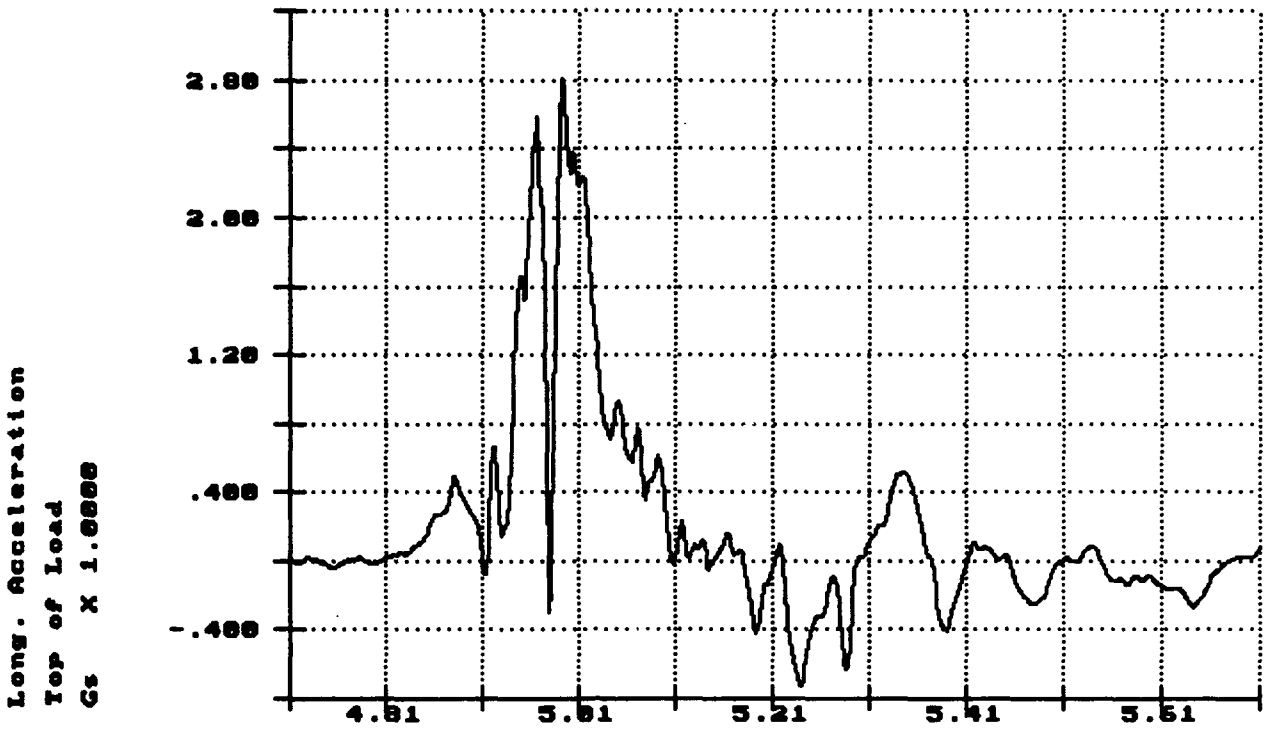
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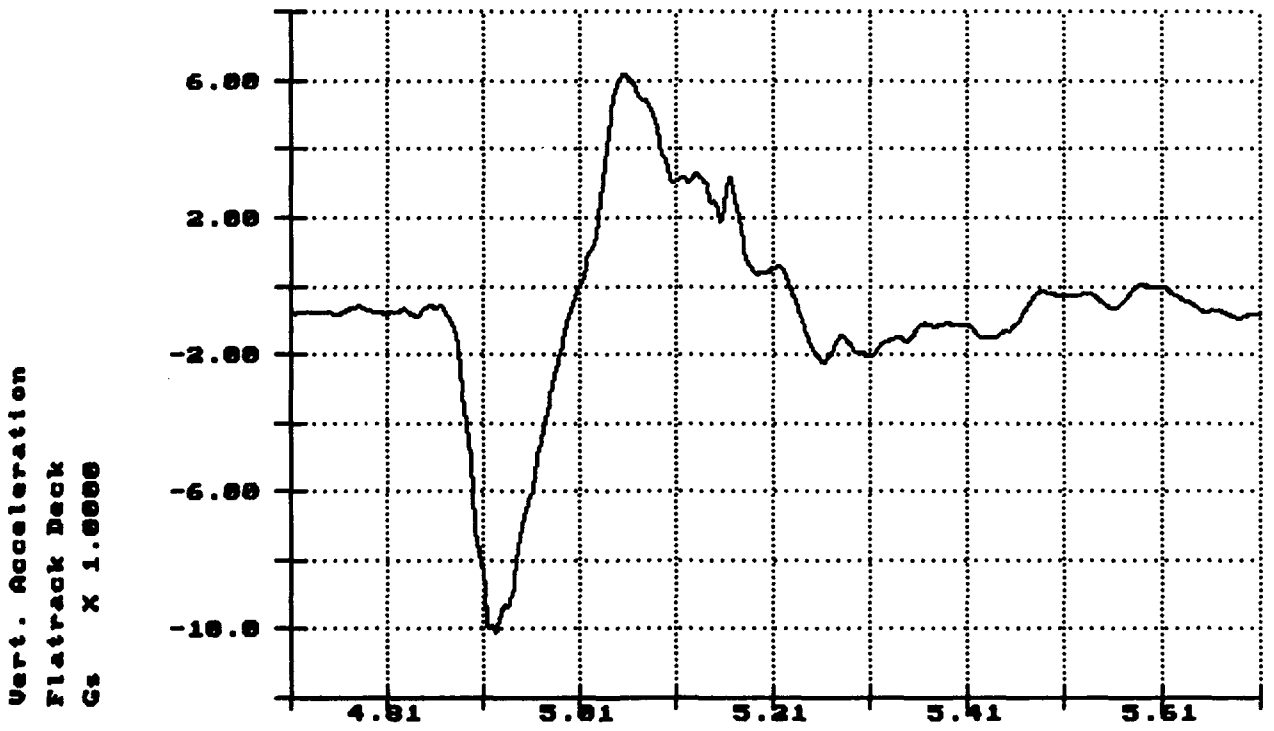
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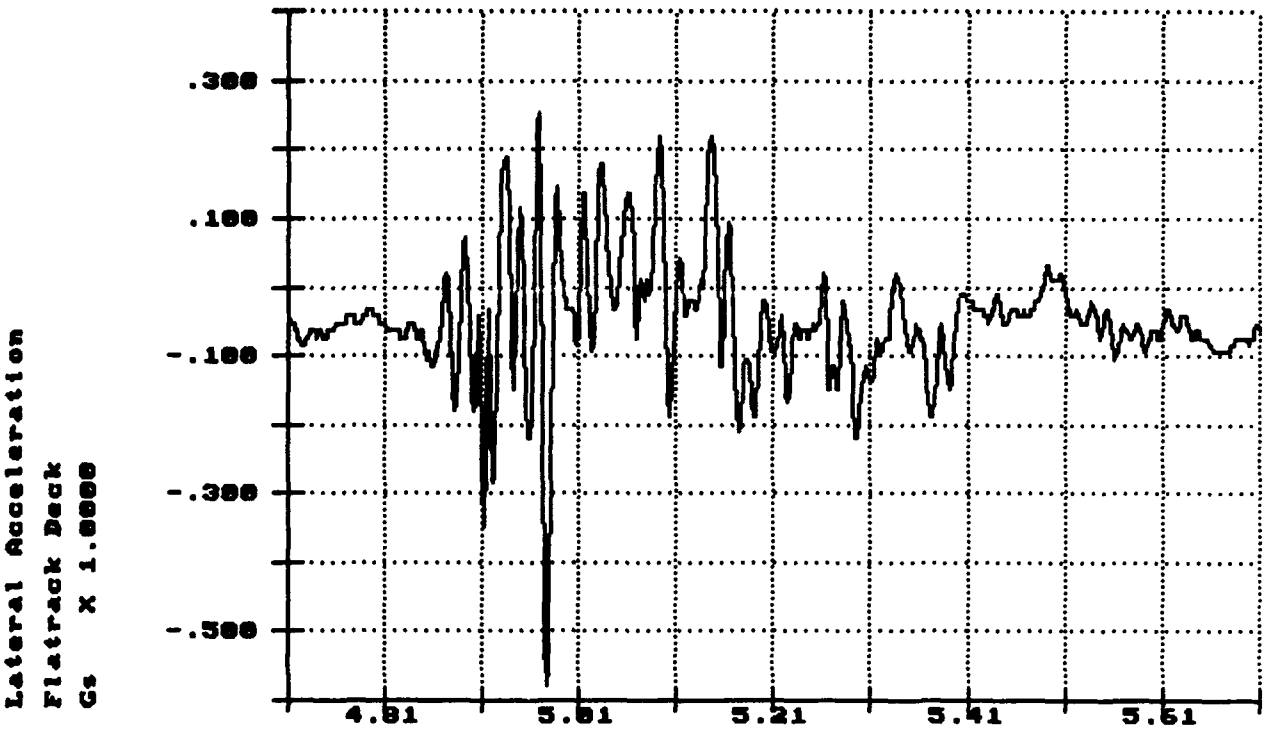
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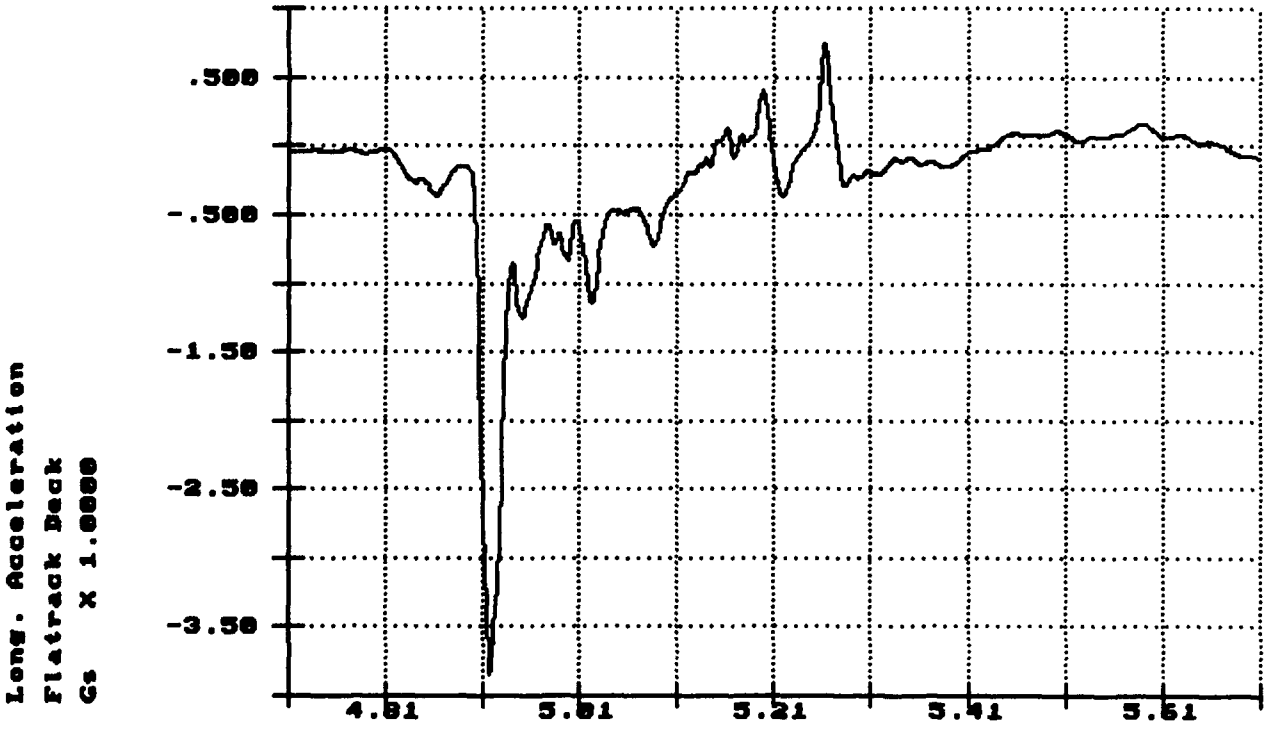
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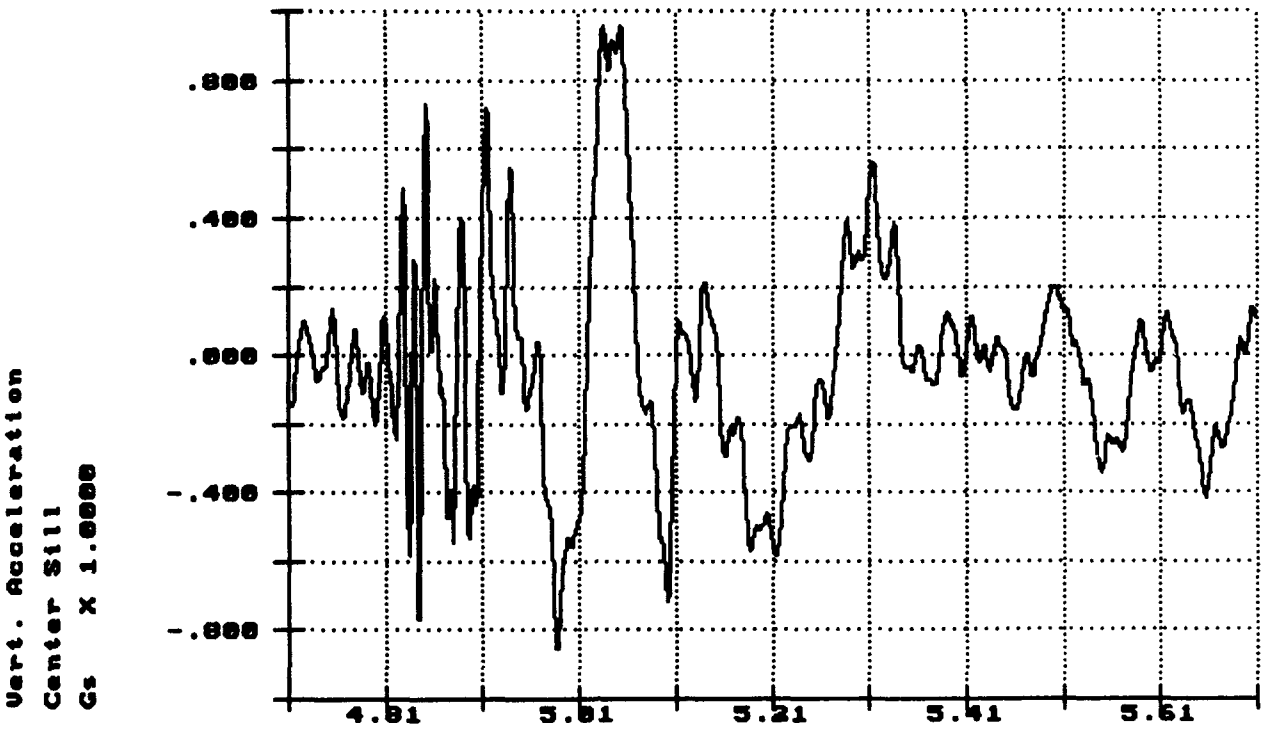
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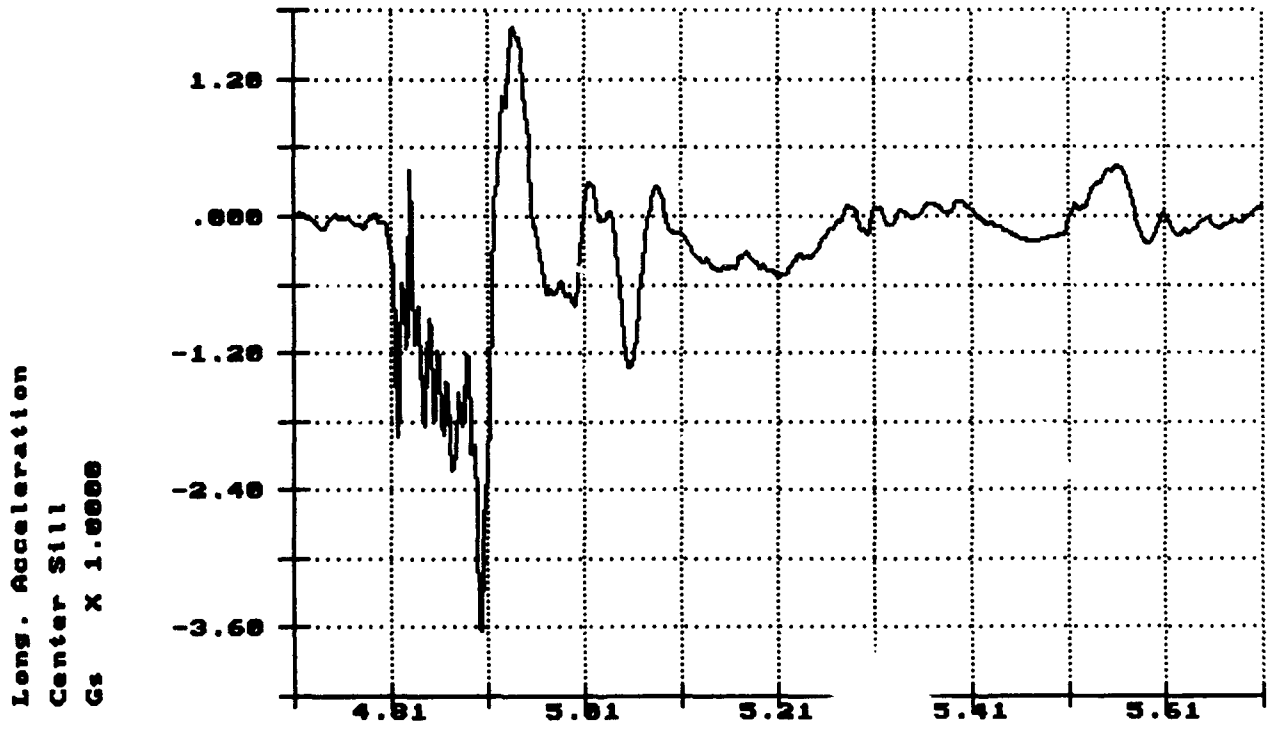
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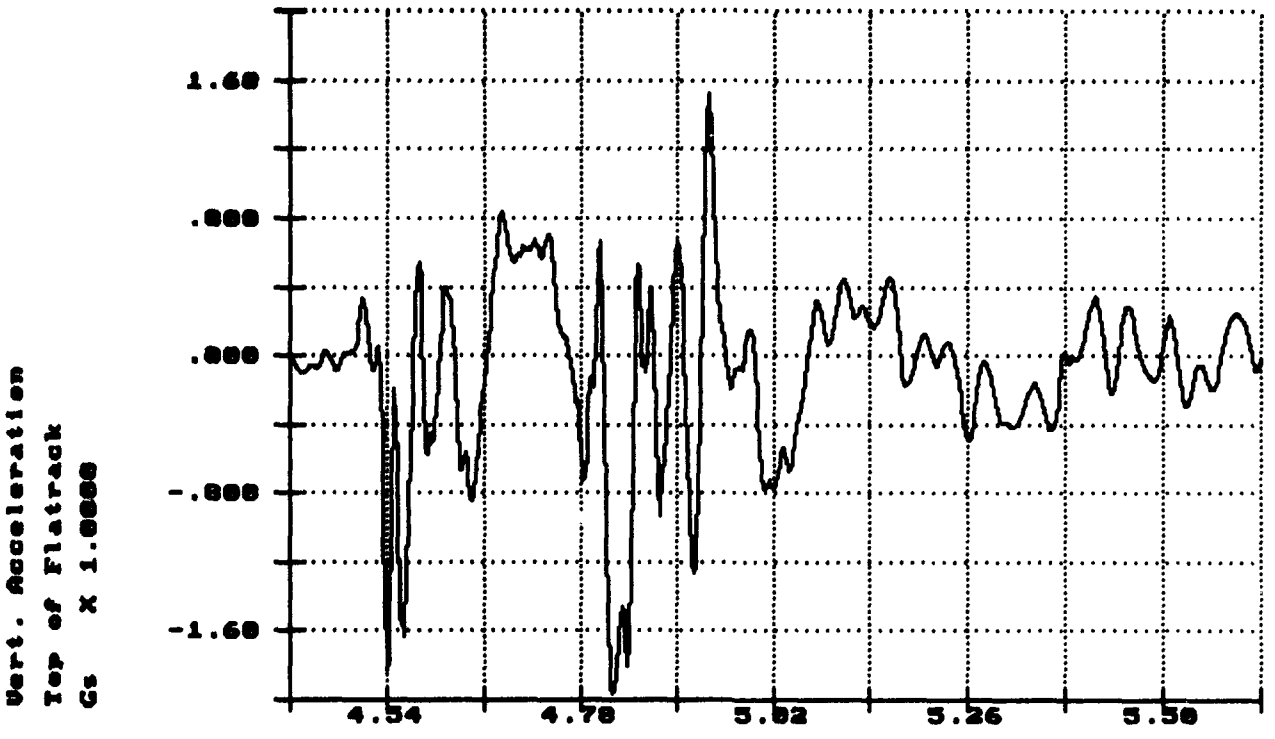
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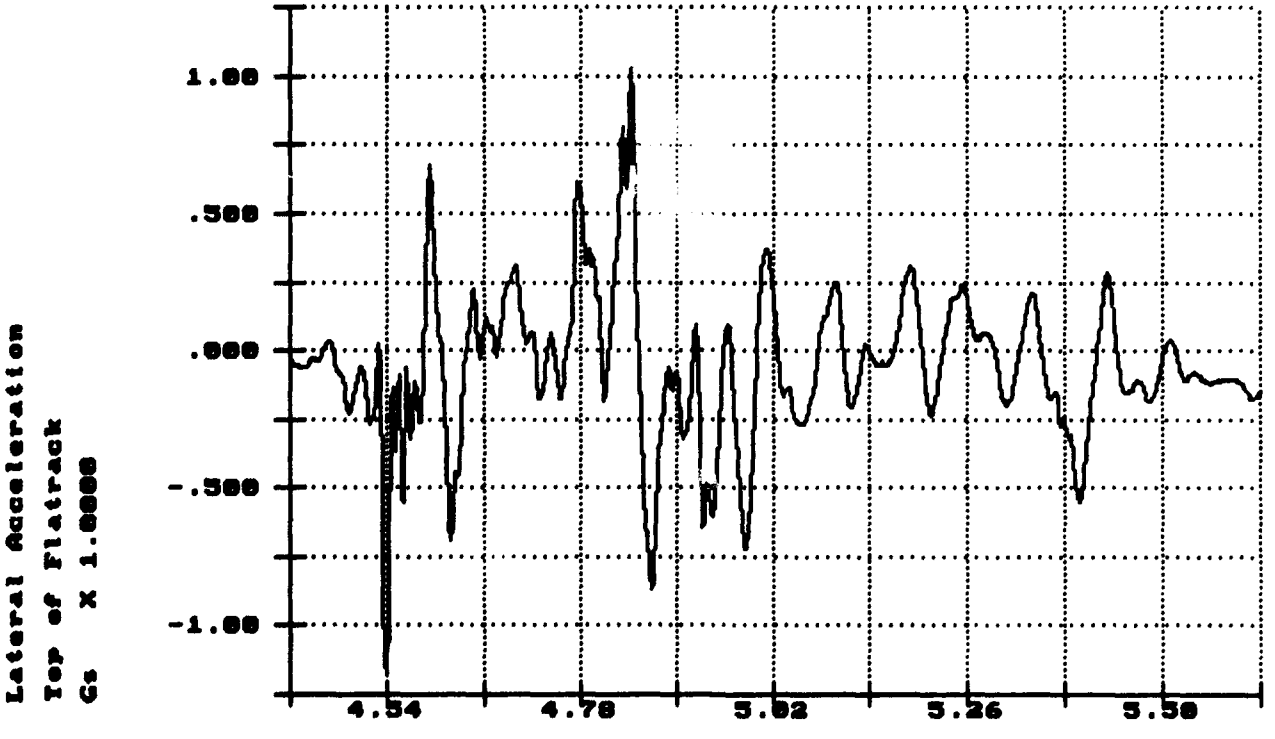
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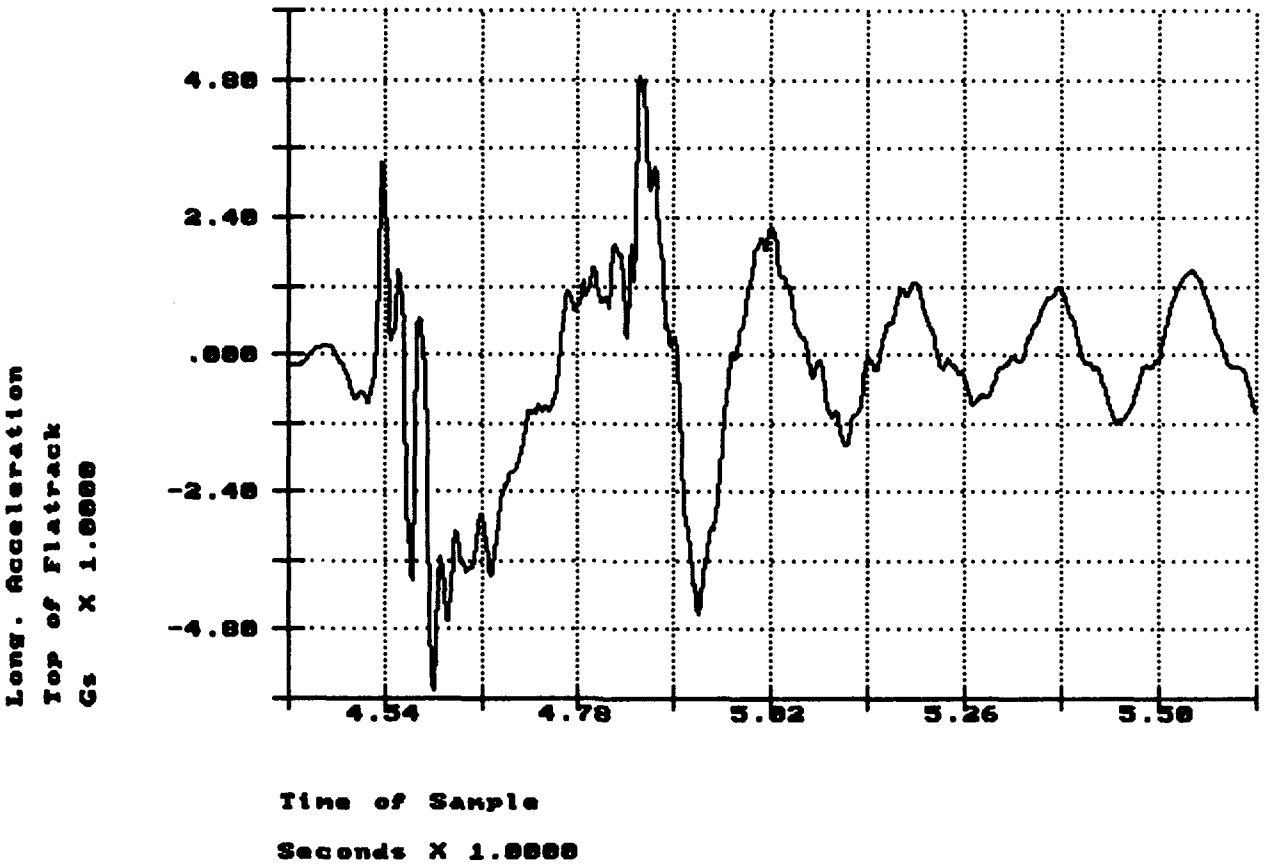
R.I. of PLS Truck, Impact 3: 8.33 MPH Nov 30 10:16:27 1993



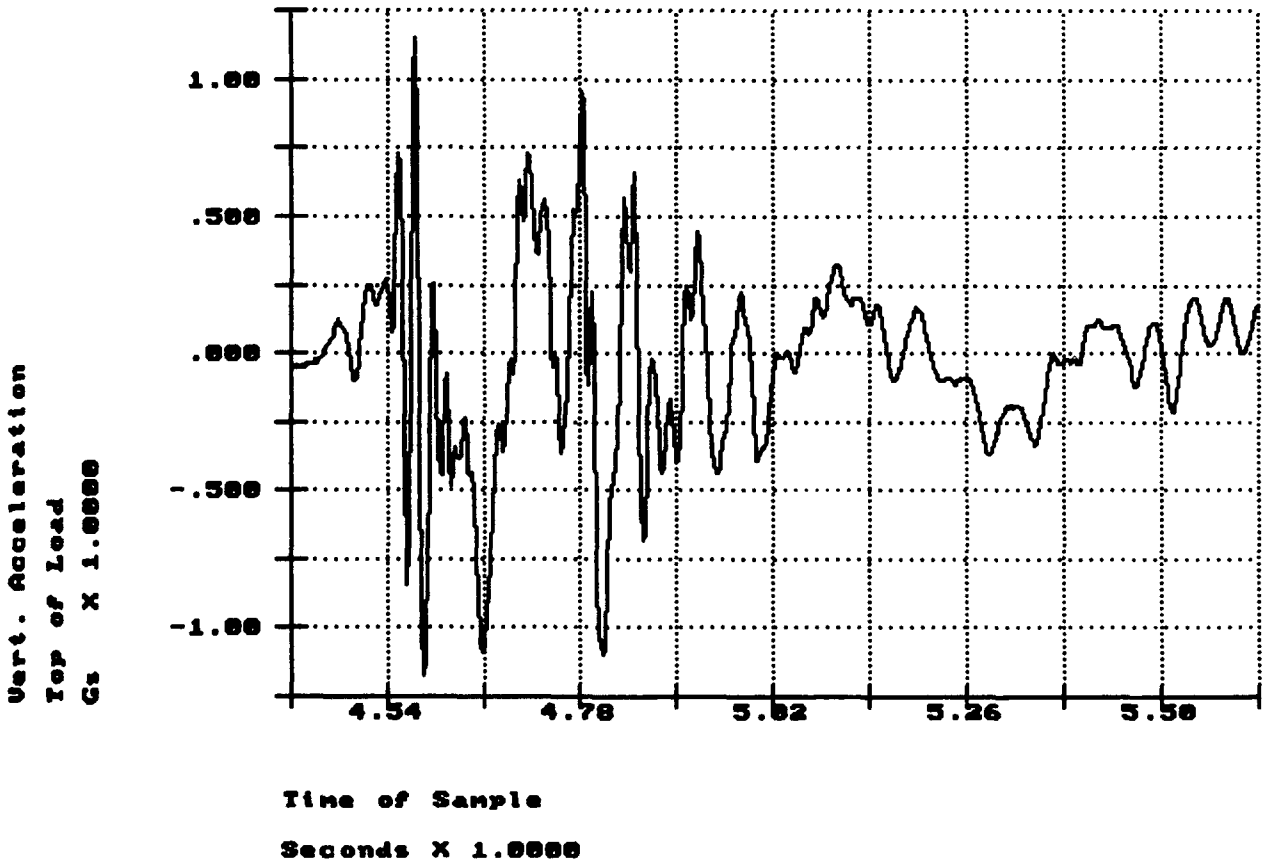
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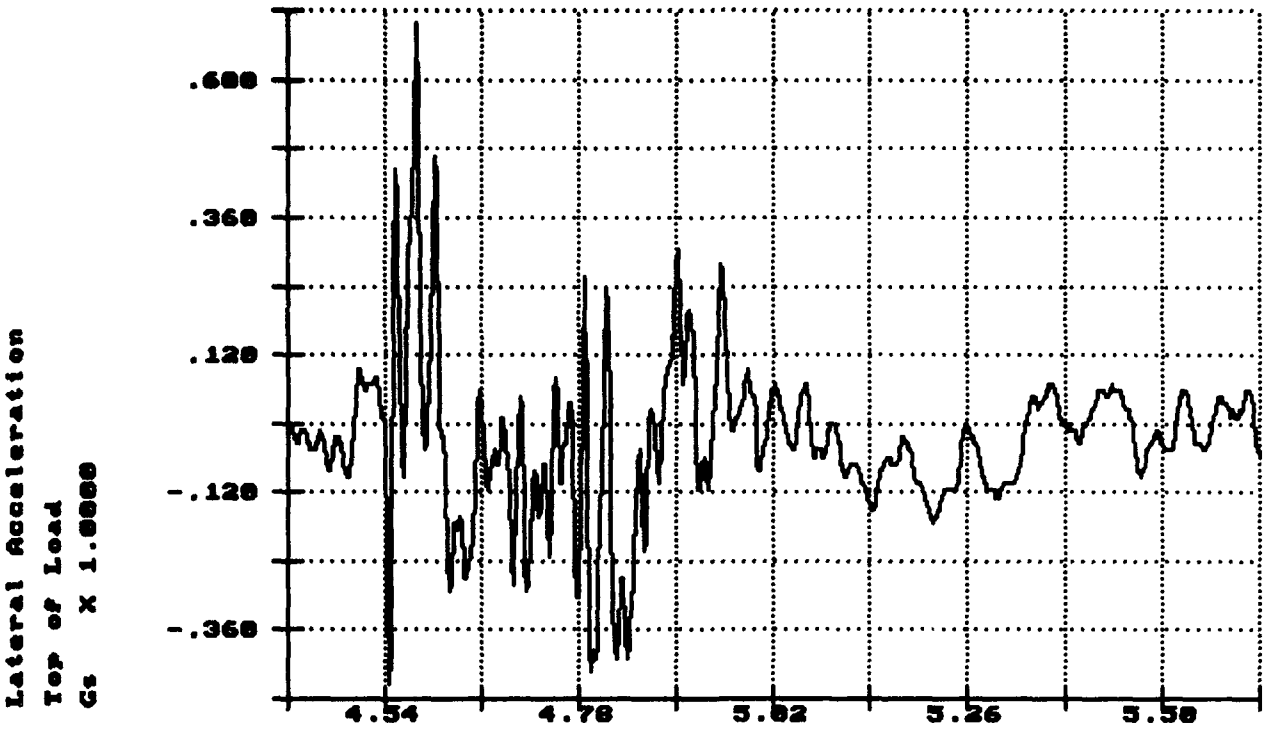
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R.I. of PLS Truck, Impact 3: 8.33 MPH Nov 30 10:16:27 1993



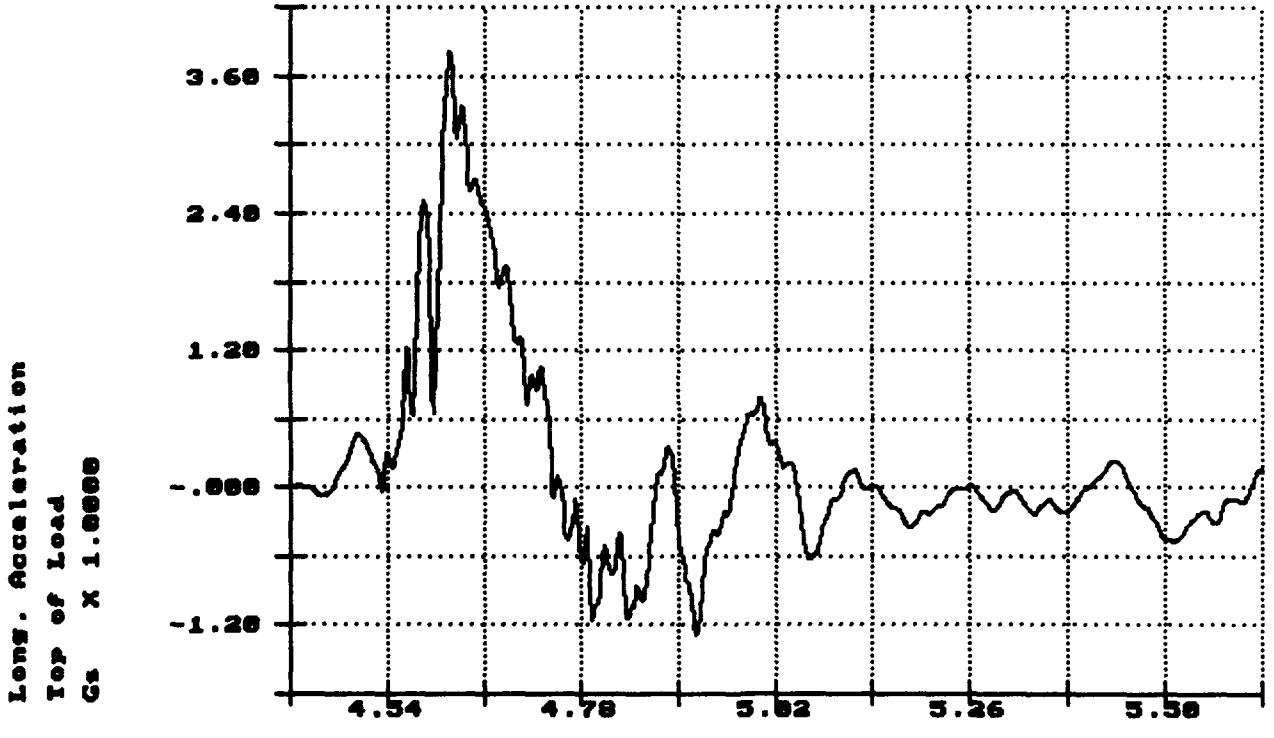
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Time of Sample

Seconds X 1.0000

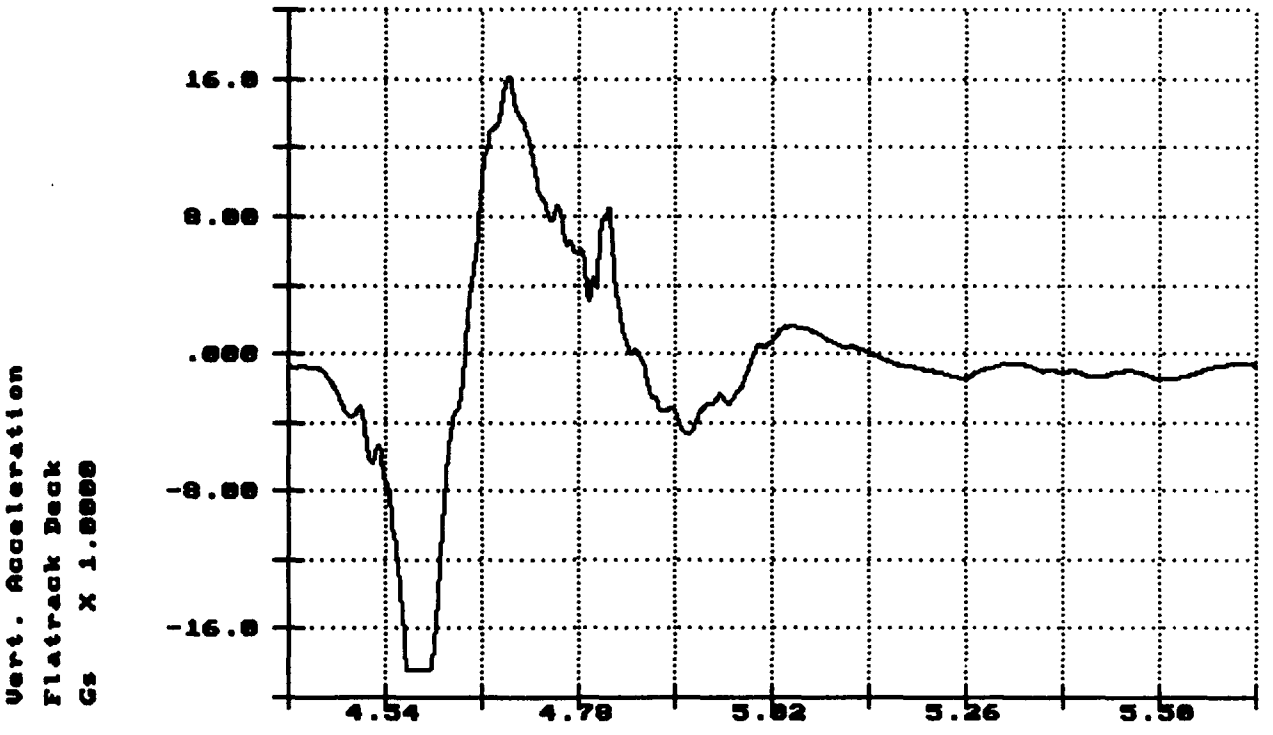
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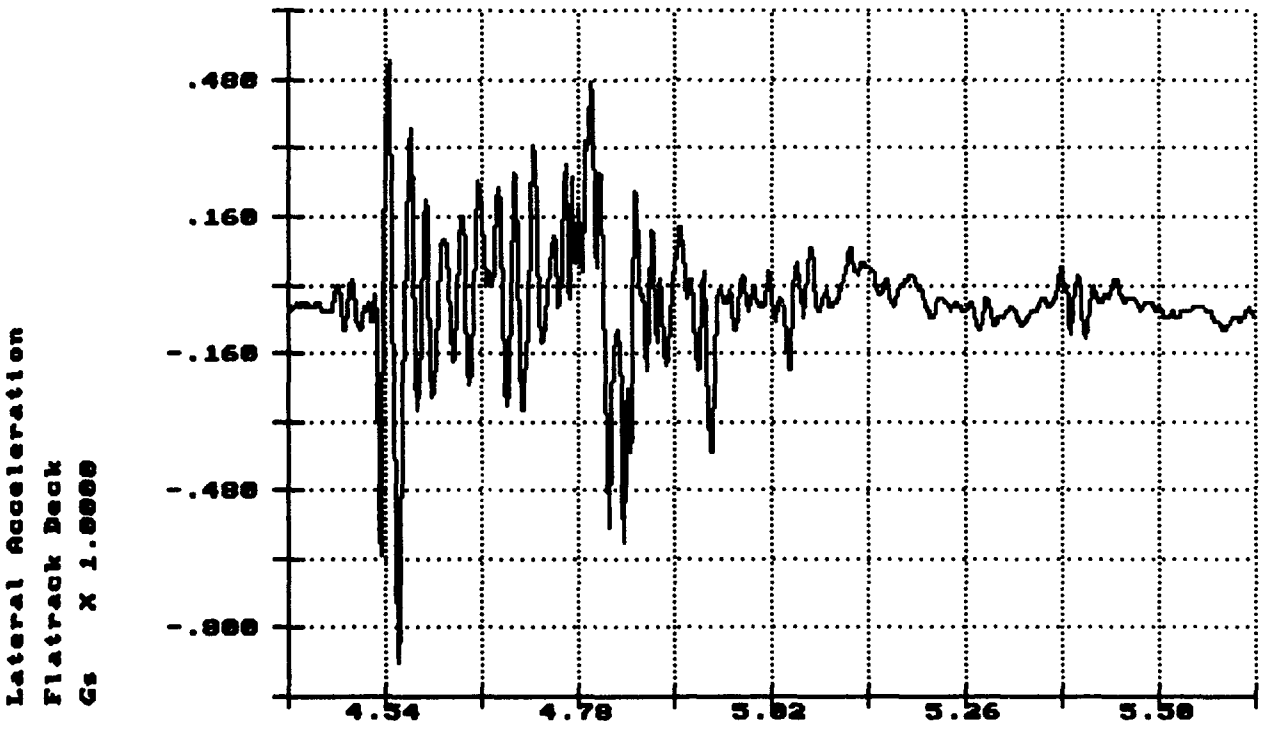
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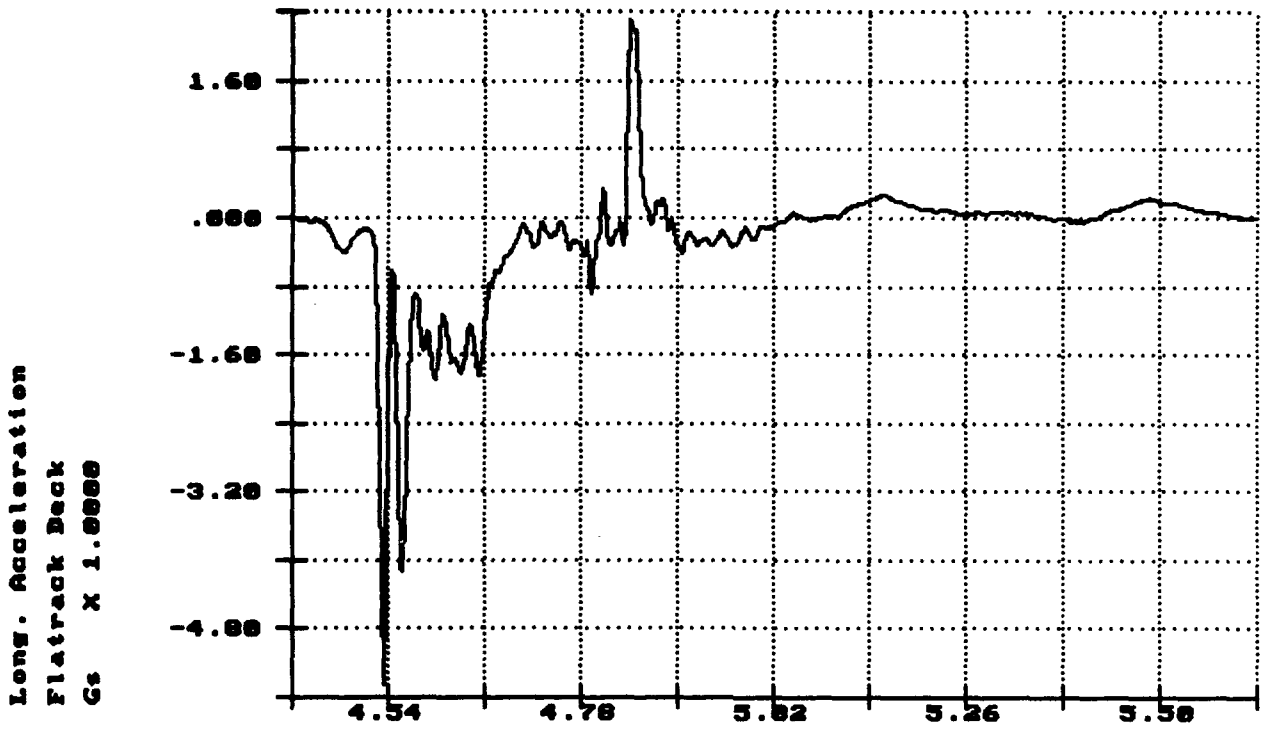
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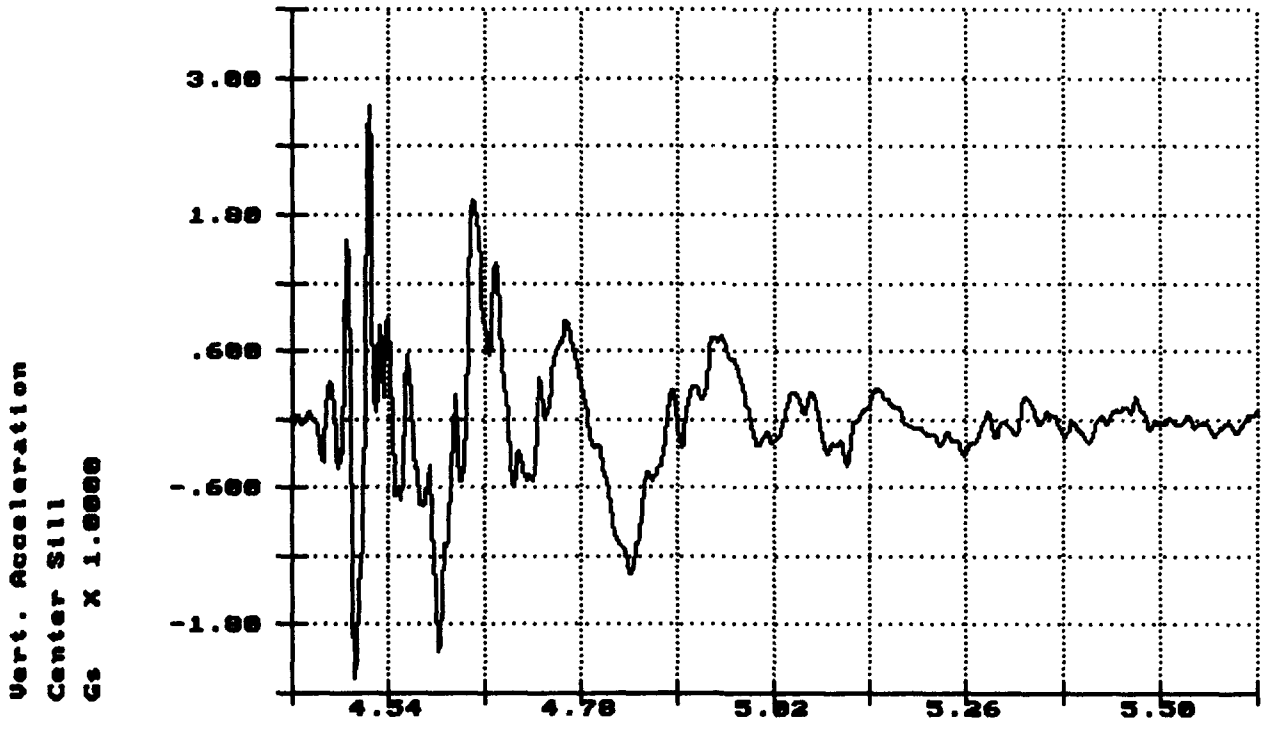
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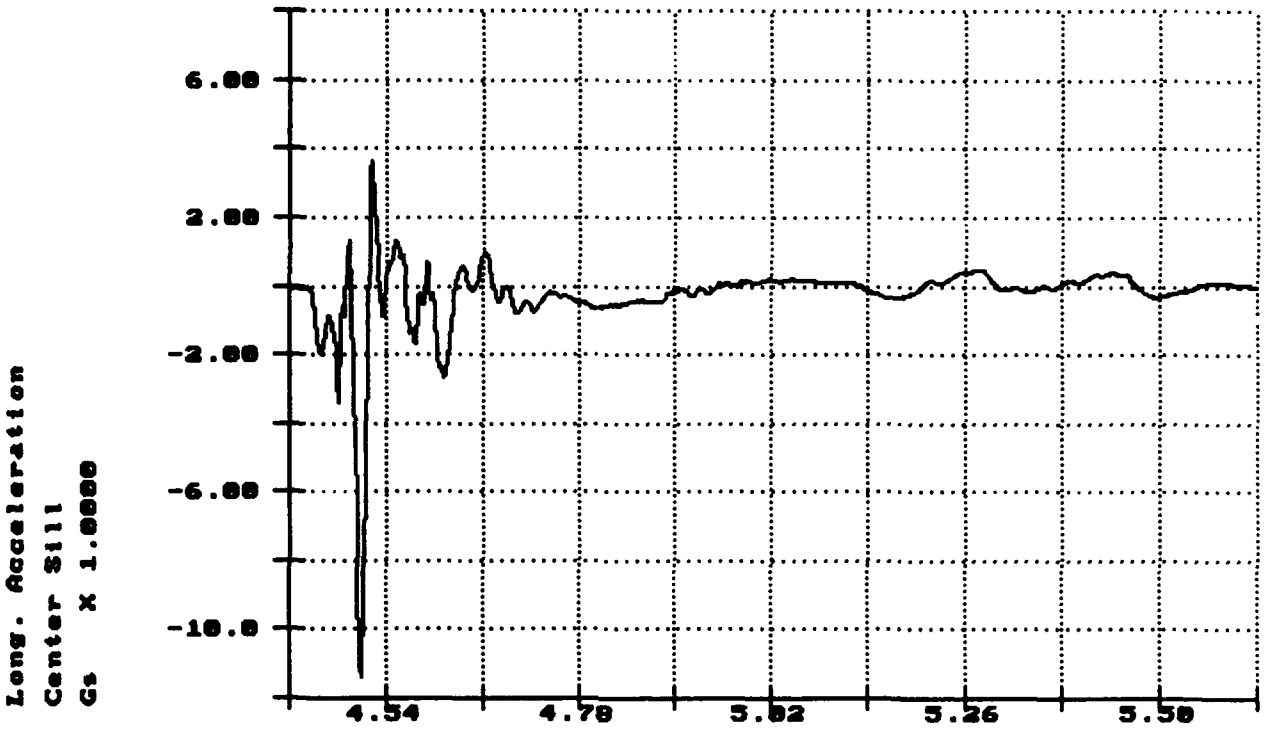
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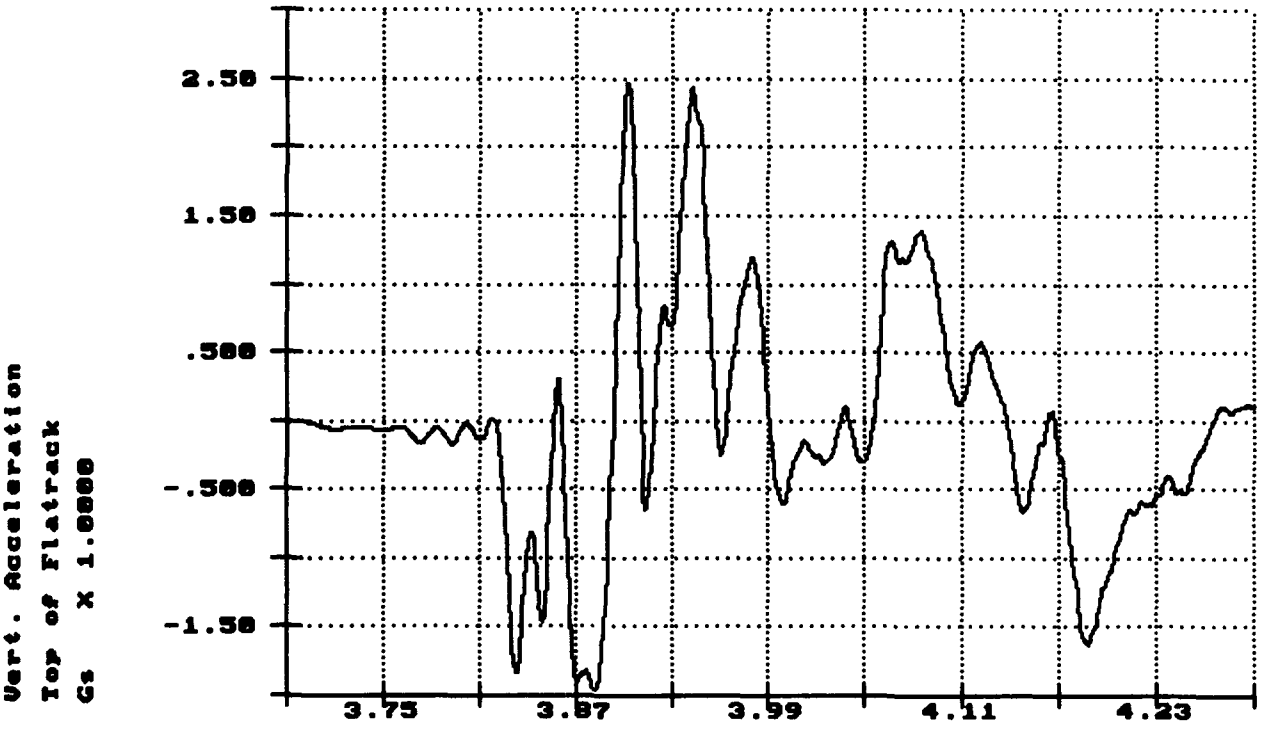
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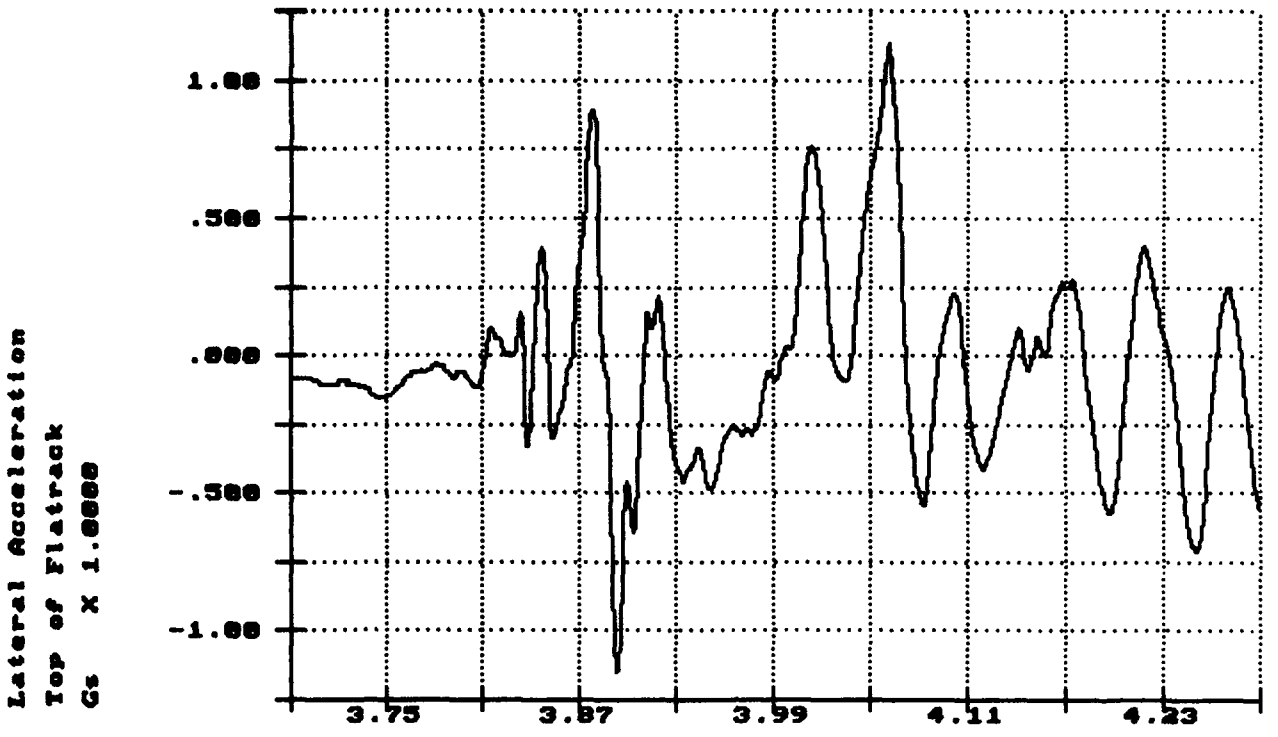
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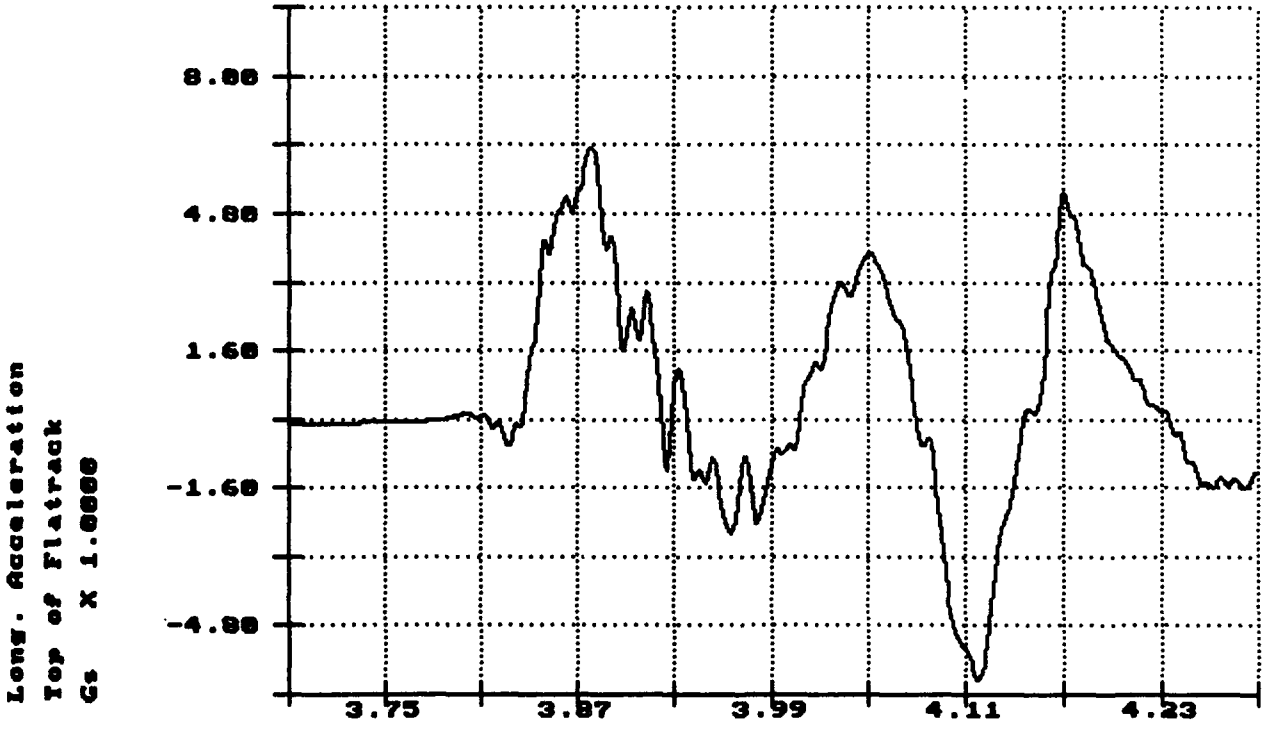
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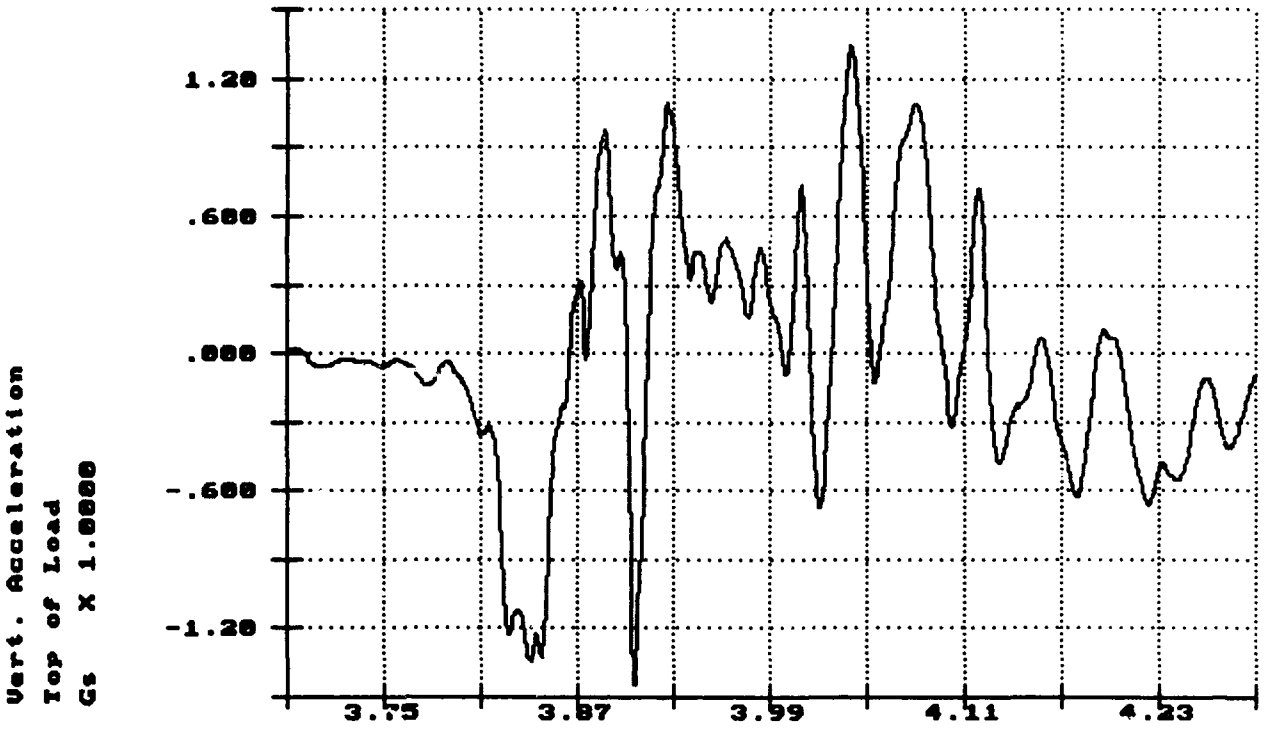
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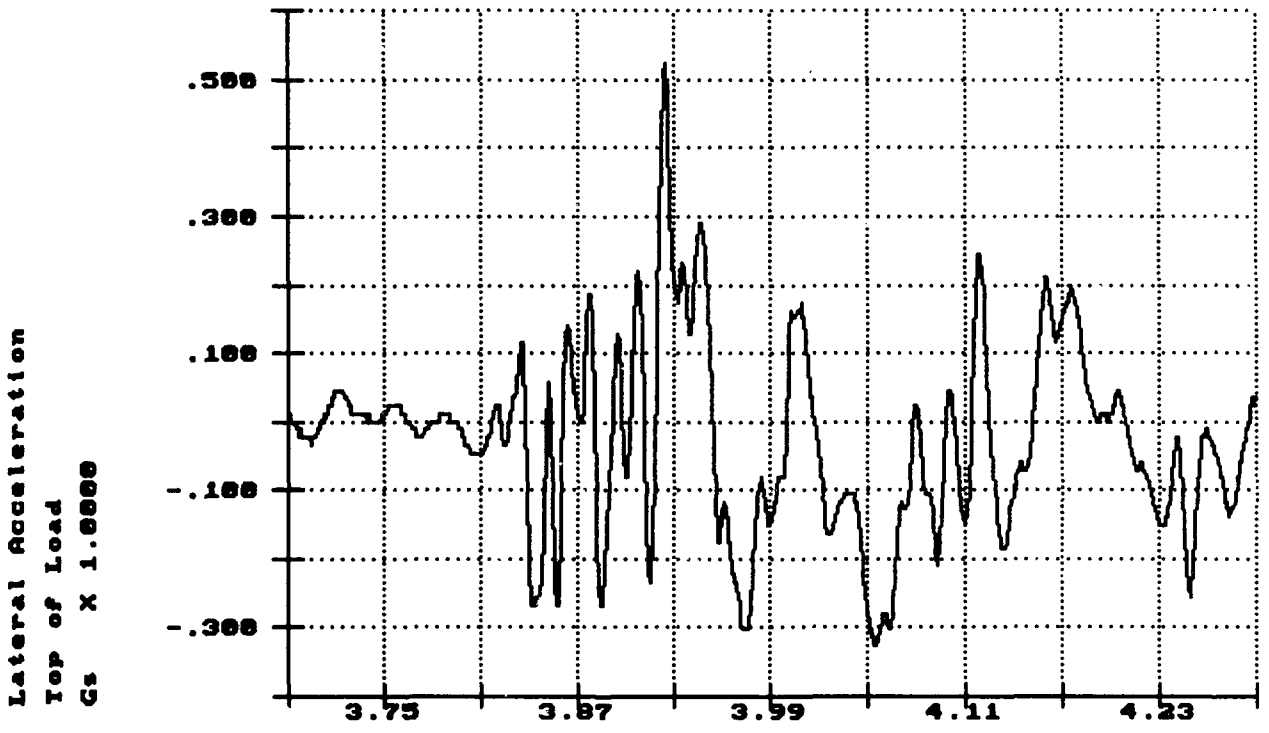
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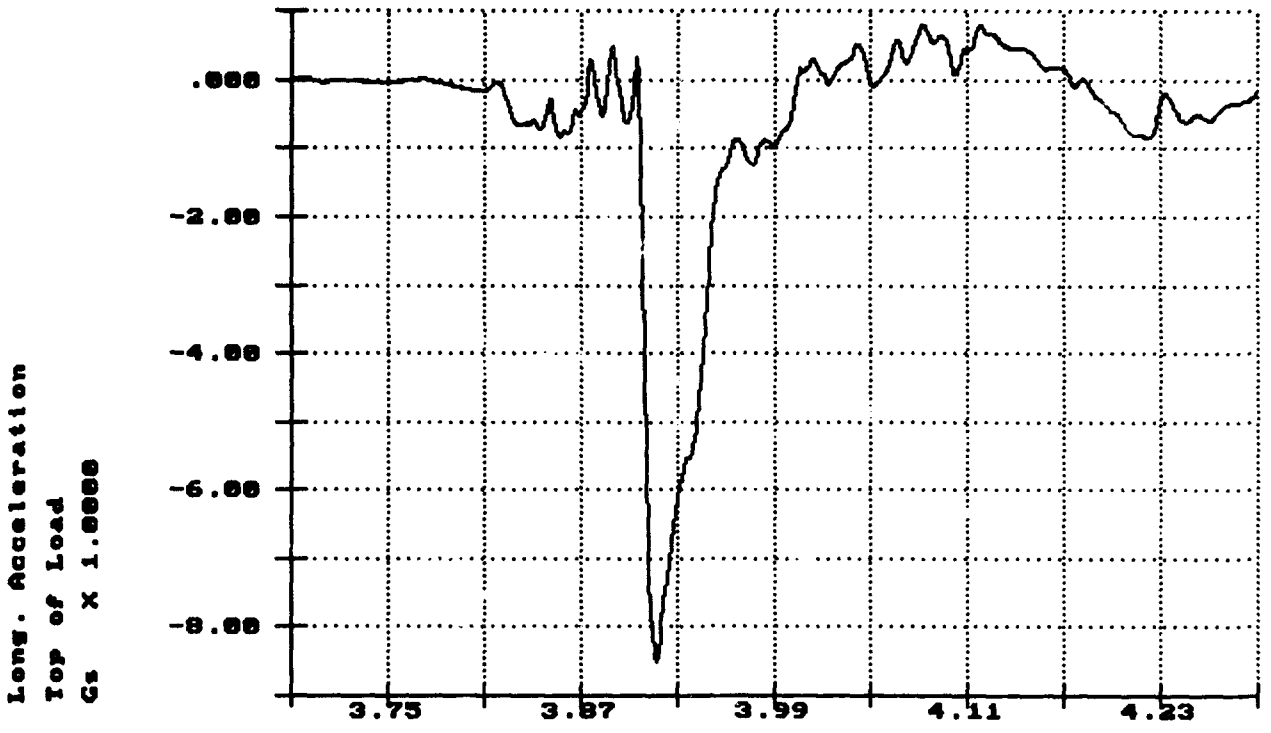
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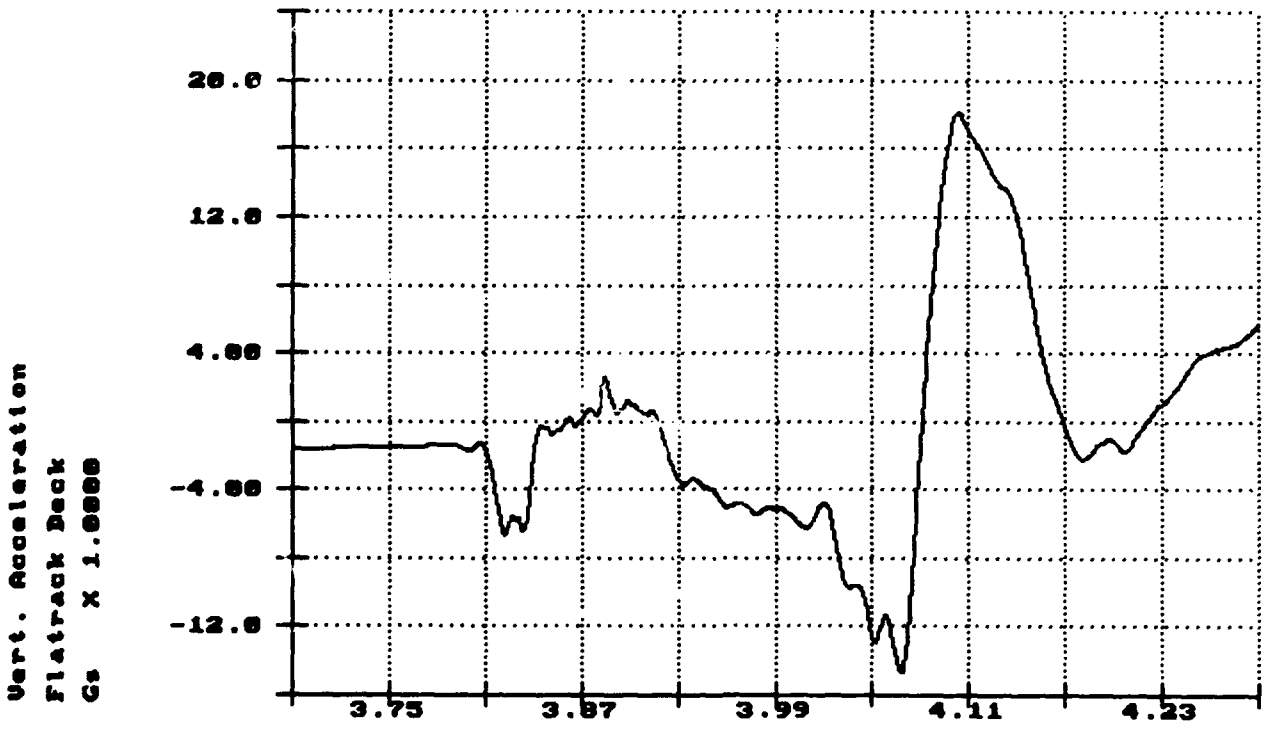
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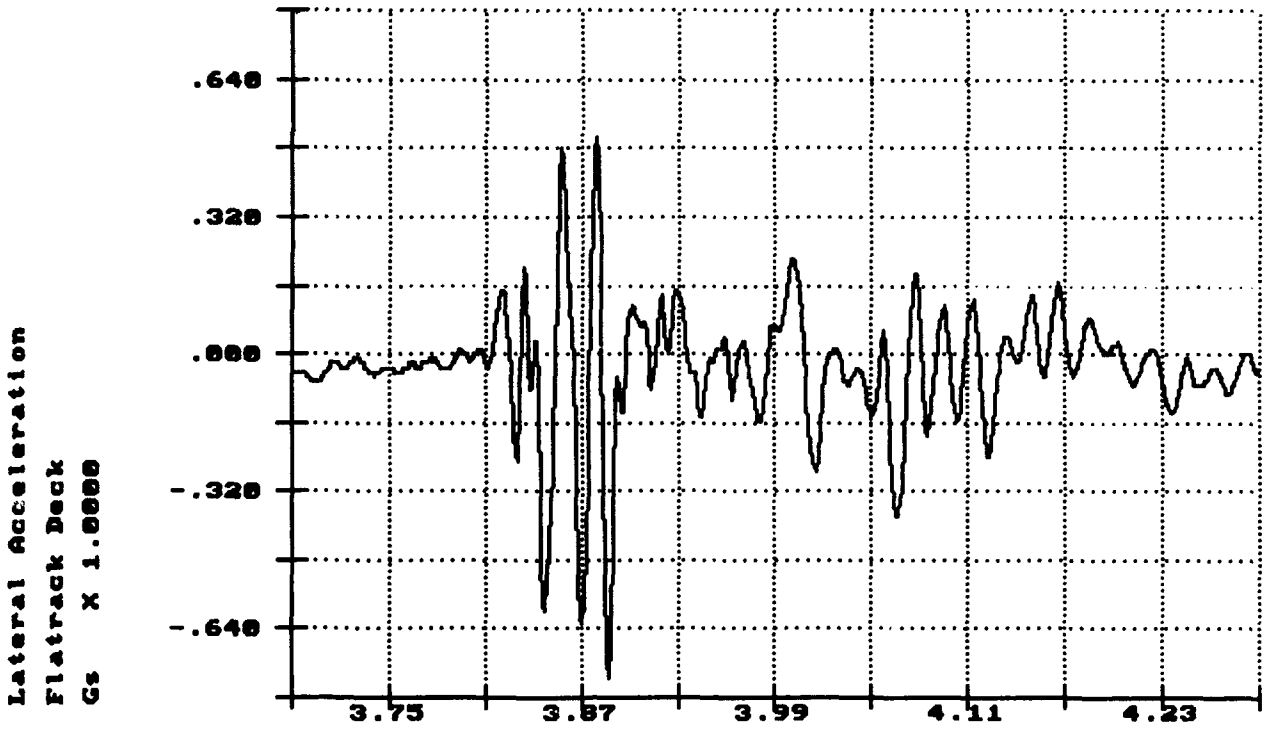
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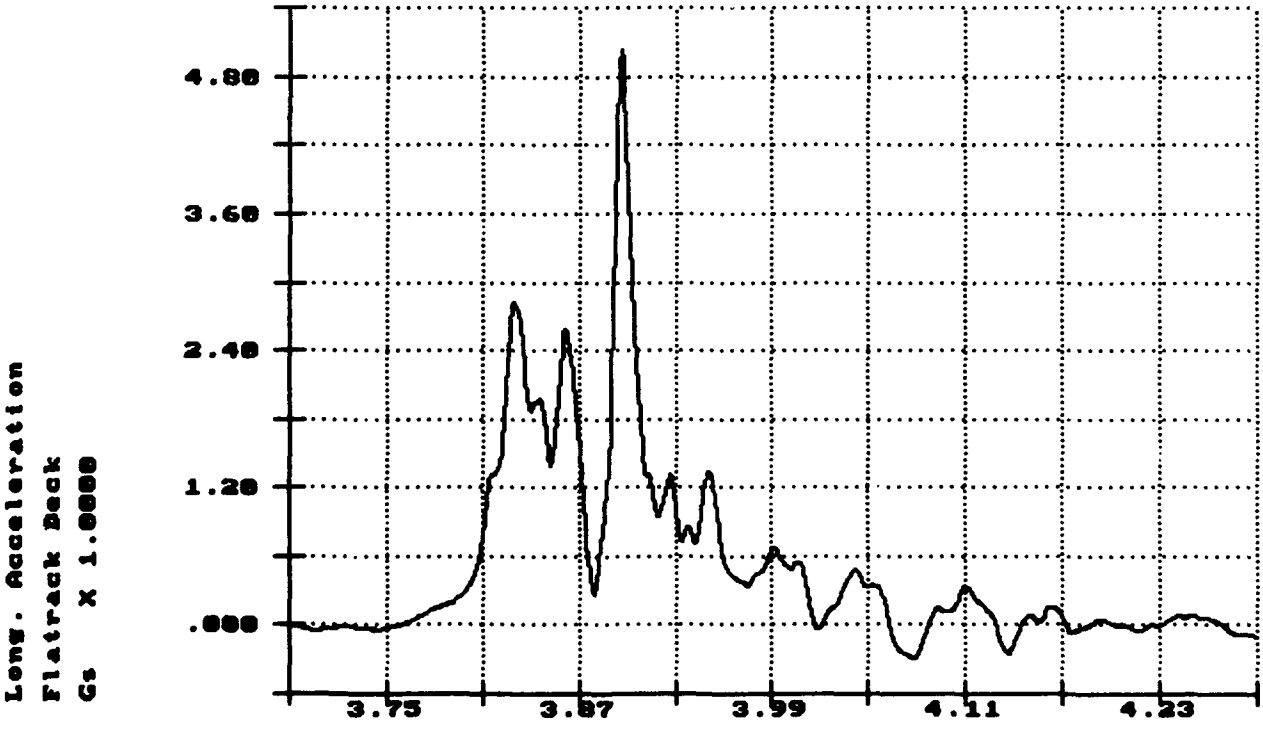
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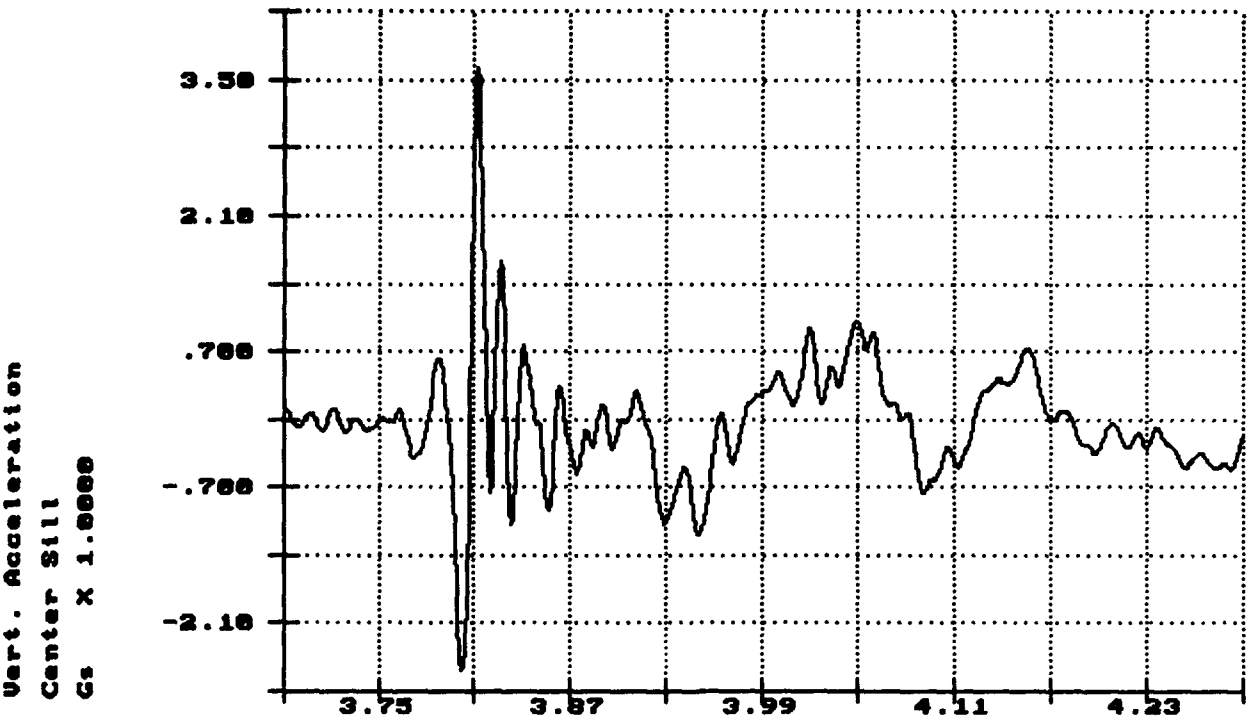
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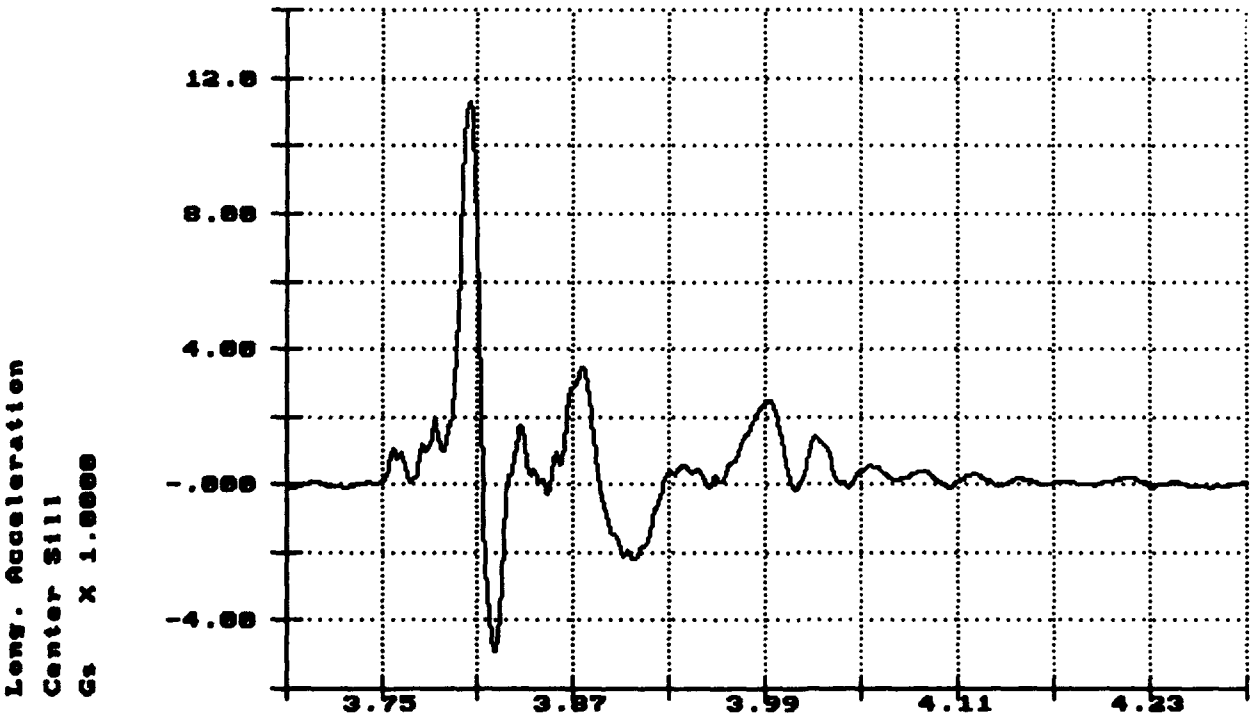
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R.I. of PLS Truck, Impact 4: 8.82 MPH Nov 30 10:49:03 1993



R.I. of PLS Truck, Impact 4: 8.82 MPH Nov 30 10:49:03 1993



TEST NO. 9

ROAD TEST DATA

Test No.: 9 Date: 1 December 1993

Specimen Loads: EPF with 155MM SLPs loaded on the PLS trailer and an EPF with 120MM tank ammunition on metal pallets loaded on the PLS truck.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.56 SEC	5.2 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	6.34 SEC	5.4 MPH

REMARKS: No damage to the EPF or load movement.

PASS 2-A OVER FIRST SERIES OF TIES:	5.87 SEC	5.6 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	6.55 SEC	5.0 MPH

REMARKS: No damage to the EPF or load movement.

30-MILE ROAD TEST: No damage or load movement.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	6.28 SEC	5.4 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	6.41 SEC	5.3 MPH

REMARKS: No damage or load movement.

PASS 4-A OVER FIRST SERIES OF TIES:	6.46 SEC	5.3 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	6.05 SEC	5.4 MPH

REMARKS: No damage or load movement.

WASHBOARD COURSE: No observed damage or load movement.

TEST NO. 10

ROAD TEST DATA

Test No.: 10 Date: 1 December 1993

Specimen Loads: EPF with 155MM SLPs loaded on the PLS truck and an EPF loaded with 120MM tank ammunition on metal pallets loaded on the PLS trailer.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.05 SEC	5.6 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	5.93 SEC	5.7 MPH

REMARKS: No damage to the EPF or load movement.

PASS 2-A OVER FIRST SERIES OF TIES:	6.34 SEC	5.2 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	6.46 SEC	5.1 MPH

REMARKS: No damage to the EPF or load movement.

30-MILE ROAD TEST: No damage or load movement.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	5.87 SEC	5.8 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	5.25 SEC	6.5 MPH

REMARKS: No damage or load movement.

PASS 4-A OVER FIRST SERIES OF TIES:	5.54 SEC	5.9 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	5.93 SEC	5.5 MPH

REMARKS: No damage or load movement.

WASHBOARD COURSE: No observed damage or load movement.

TEST NO. 11

RAIL IMPACT DATA

Test No.: 11 Date: 6 December 1993

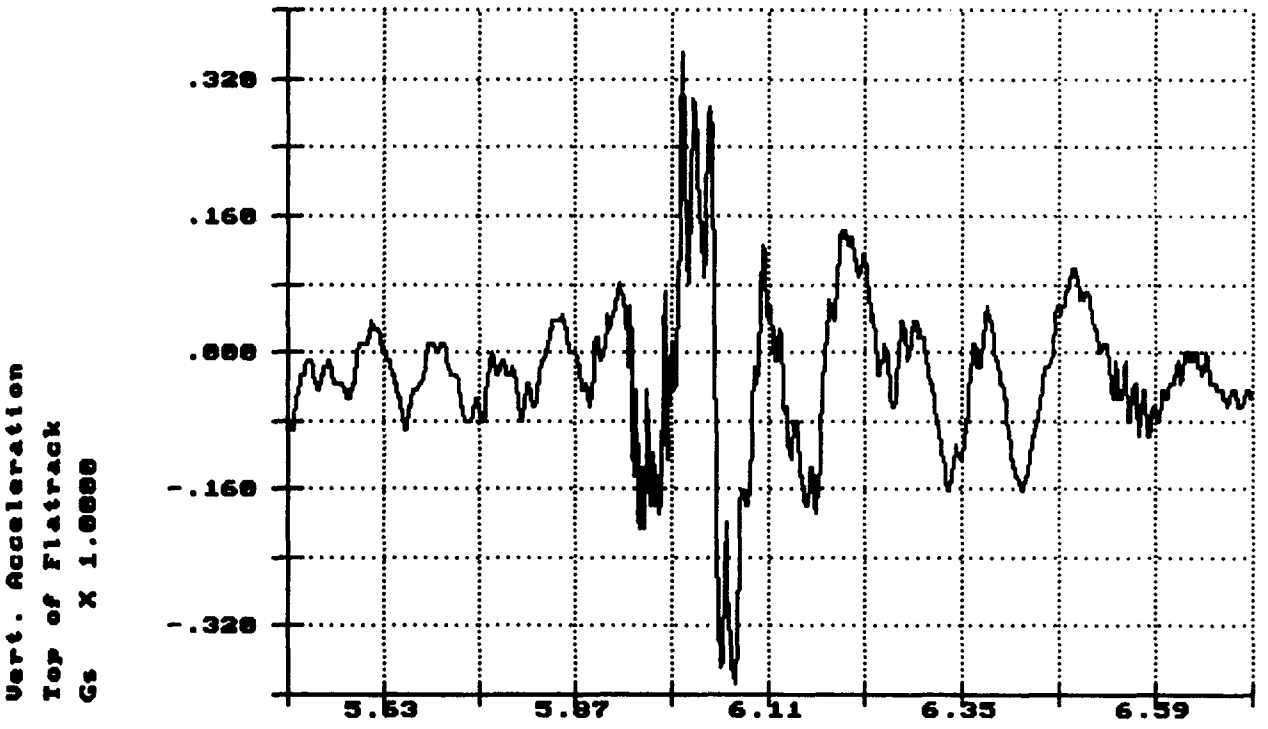
Specimen Loads: EPF with propelling charge containers on wooden pallets and Multiple Launch Rocket System (MLRS) pods on a COFC railcar.

Flatcar No.: TTWX 978622	Lt. Wt.:	73,000
EPF No. 1	Wt.:	7,500
Lading, Propelling Charge Containers on Wooden Pallets	Wt.:	14,128
EPF No. 2	Wt.:	7,500
Lading, Four MLRS Pods	Wt.:	22,000
	Total Specimen Wt.:	124,128
	Buffer Car (five cars) Wt:	250,000

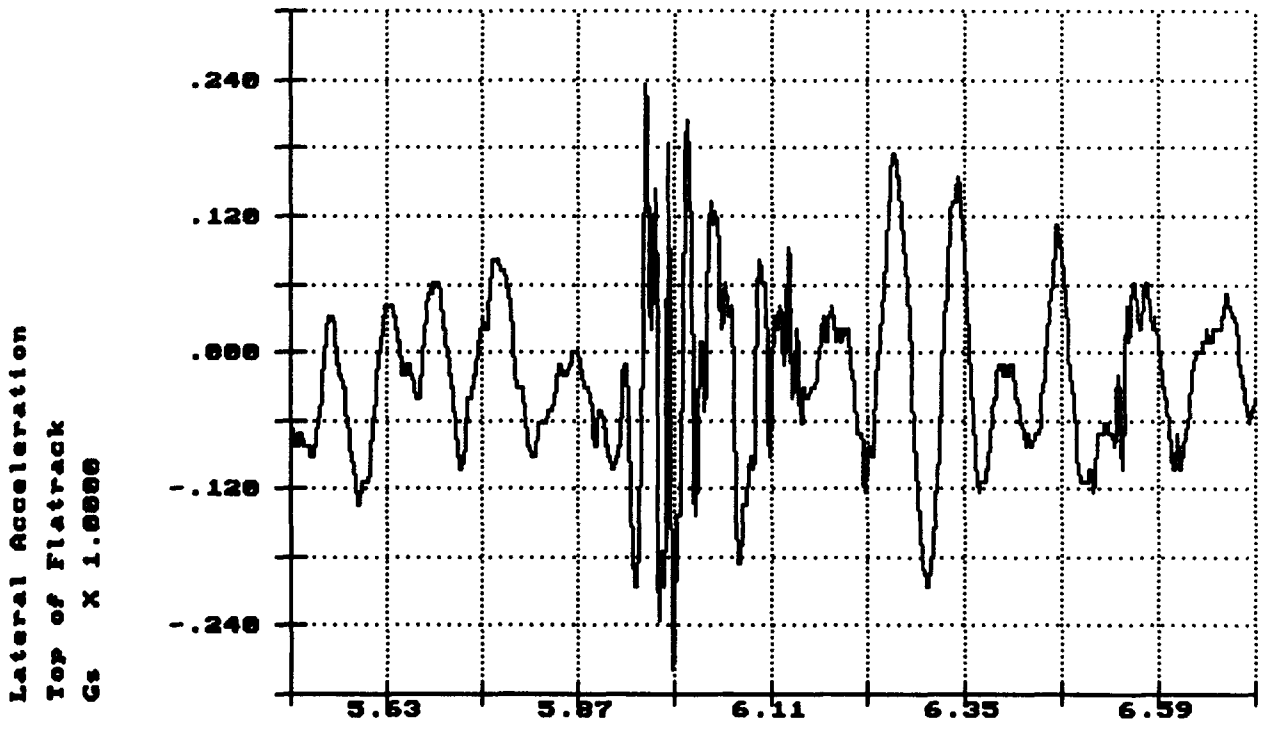
Impact	End Struck	Velocity	Remarks
1	Forward*	4.55	No load movement.
2	Forward	6.52	No load movement.
3	Forward	8.92	Propelling charge container load compacted toward impact end with a 2-inch gap at the rear wall. MLRS pods had a 1/2-inch gap at the rear wall.
4	Rear	8.82	Propelling charge container load shifted back 2 inches. MLRS pods recovered 1/2-inch at the forward wall. The MLRS pod frame cut into the 4- by 4-foot blocking. Struts were pulling out.

* EPF bail bar impacted buffer cars first.

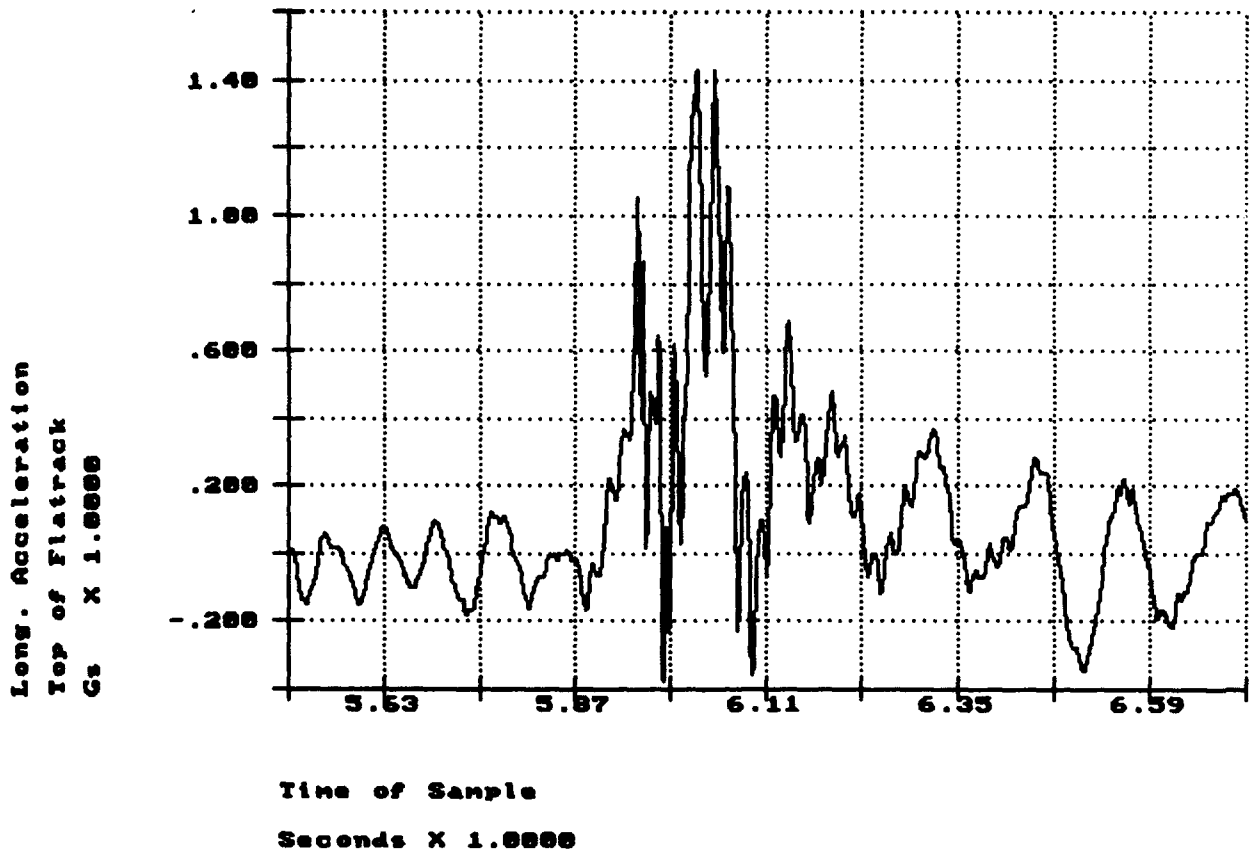
R.I. of PLS Flatracks, Impact 1: 4.55MPH Dec 06 10:37:28 1993



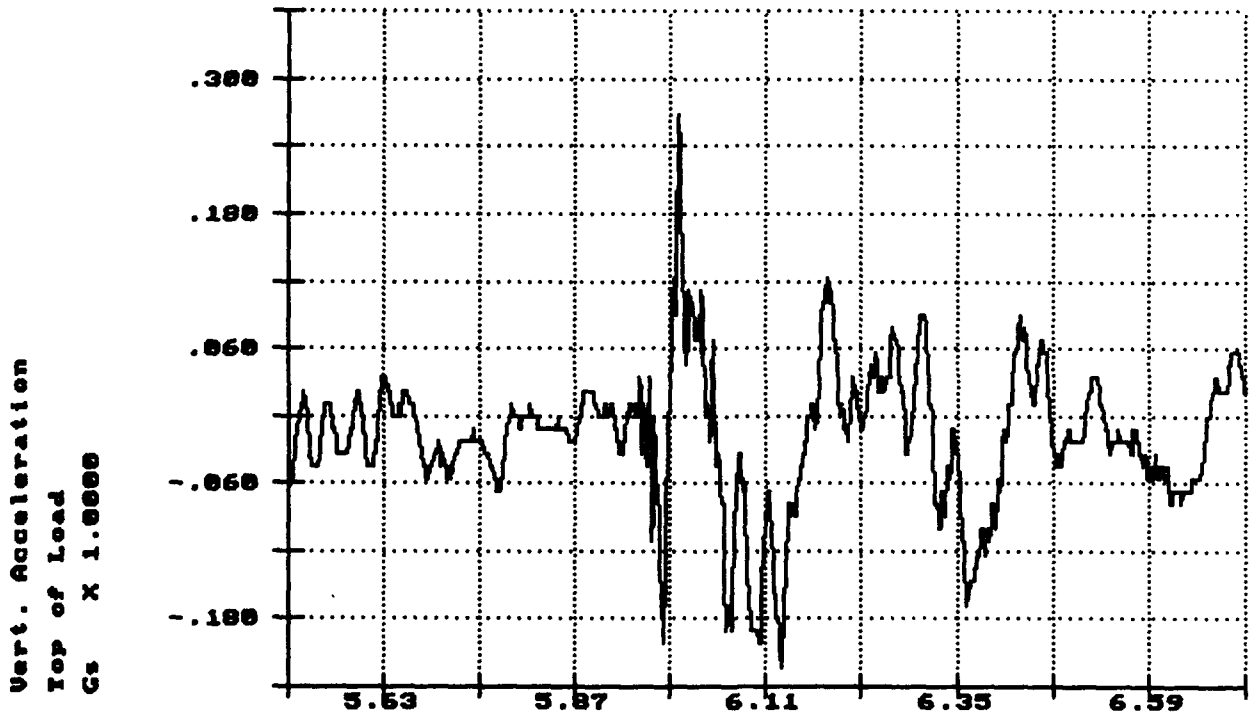
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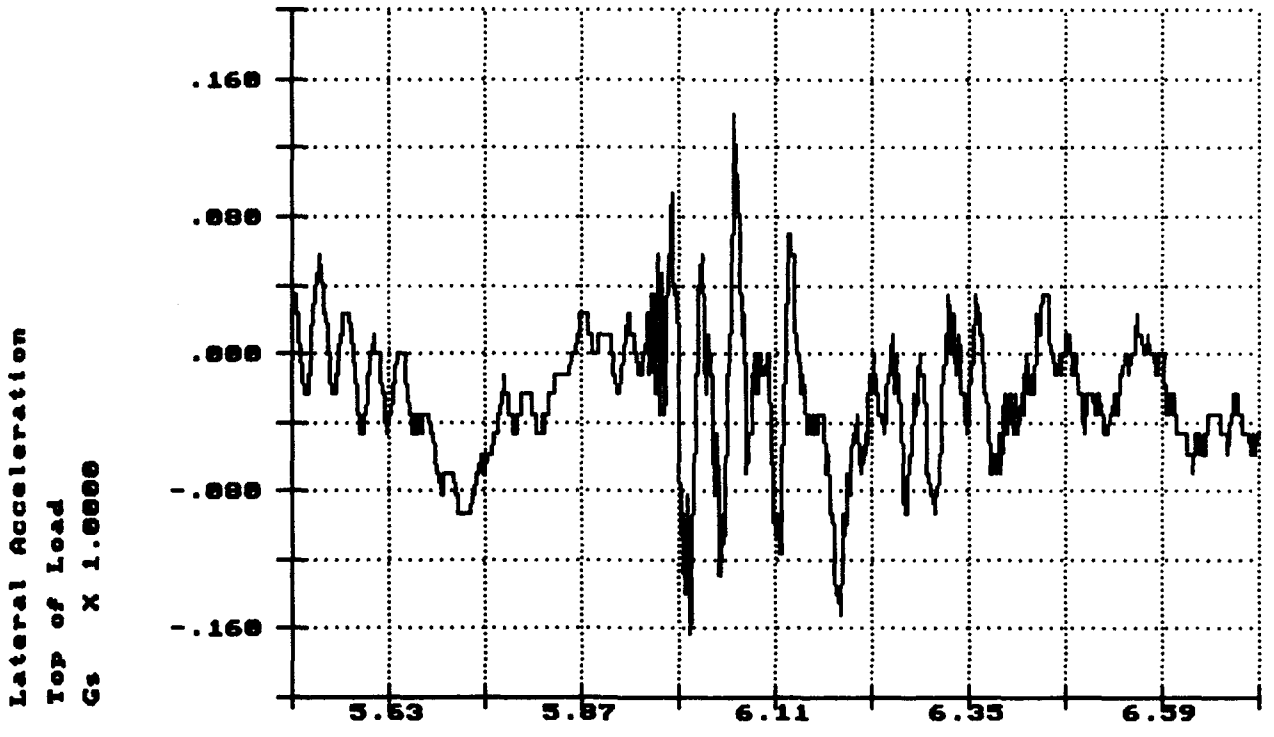
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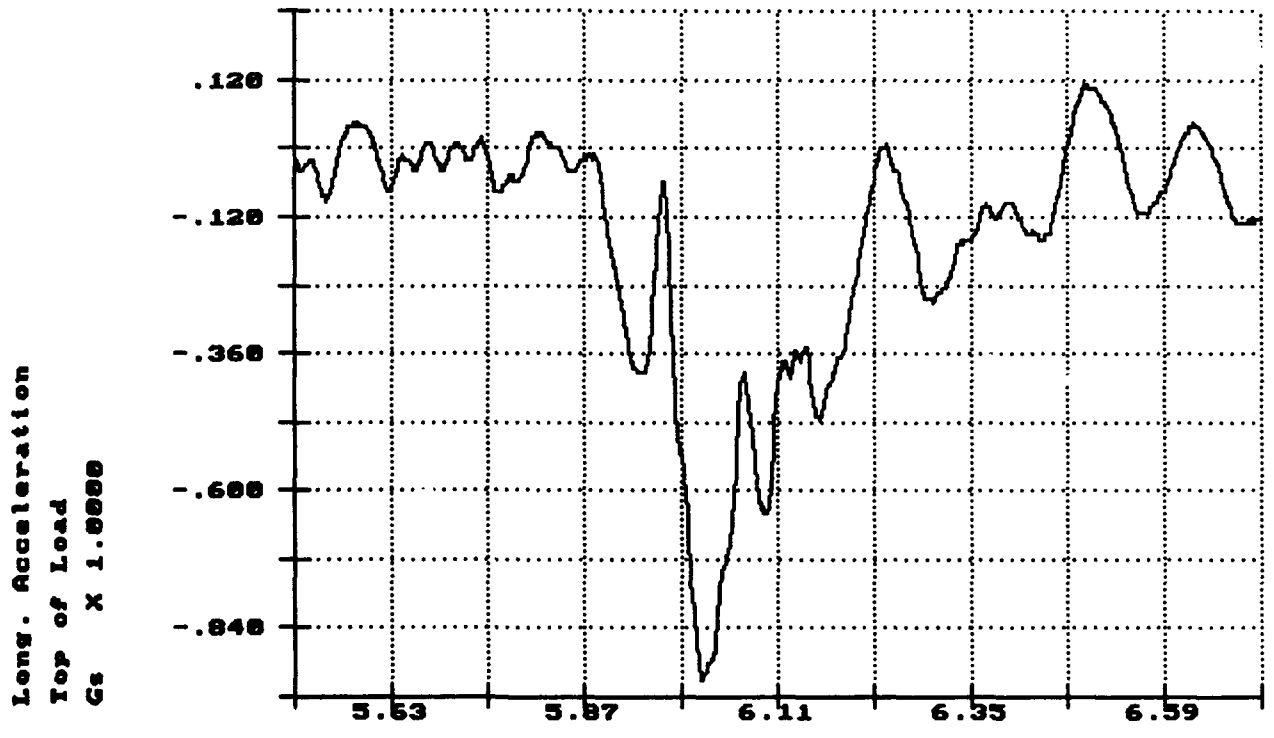
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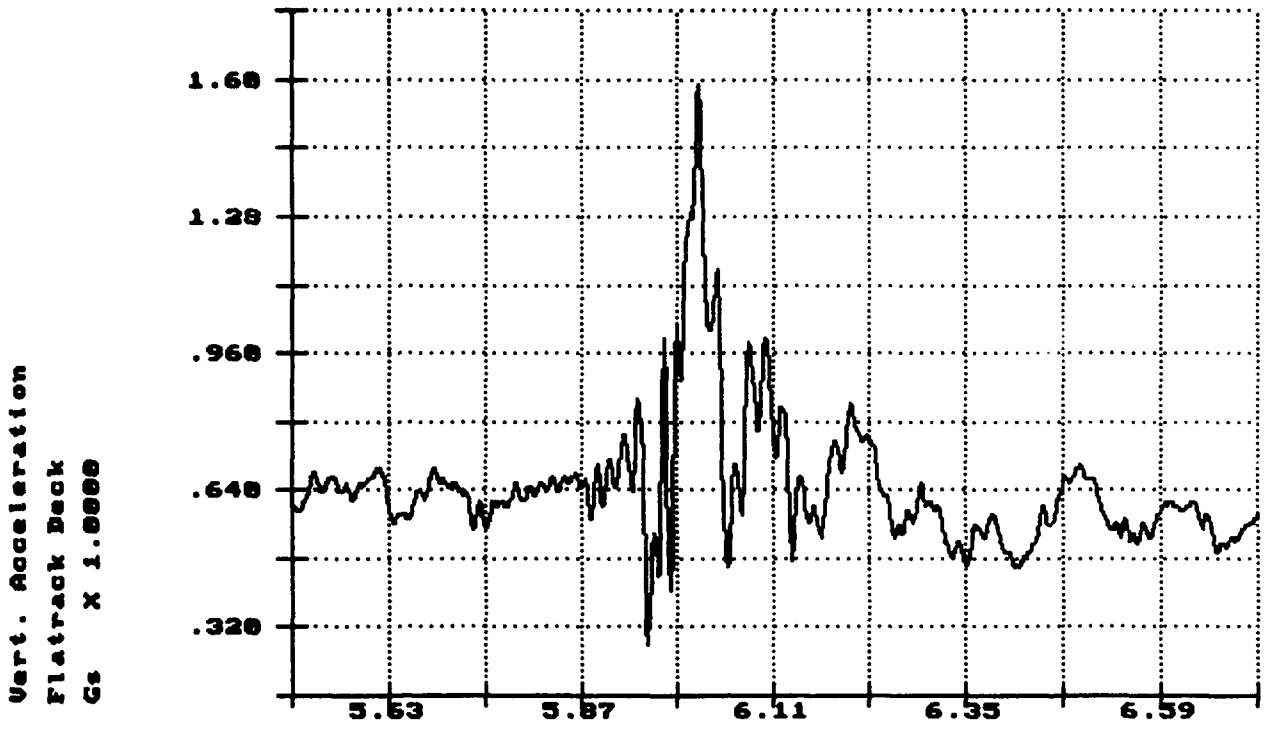
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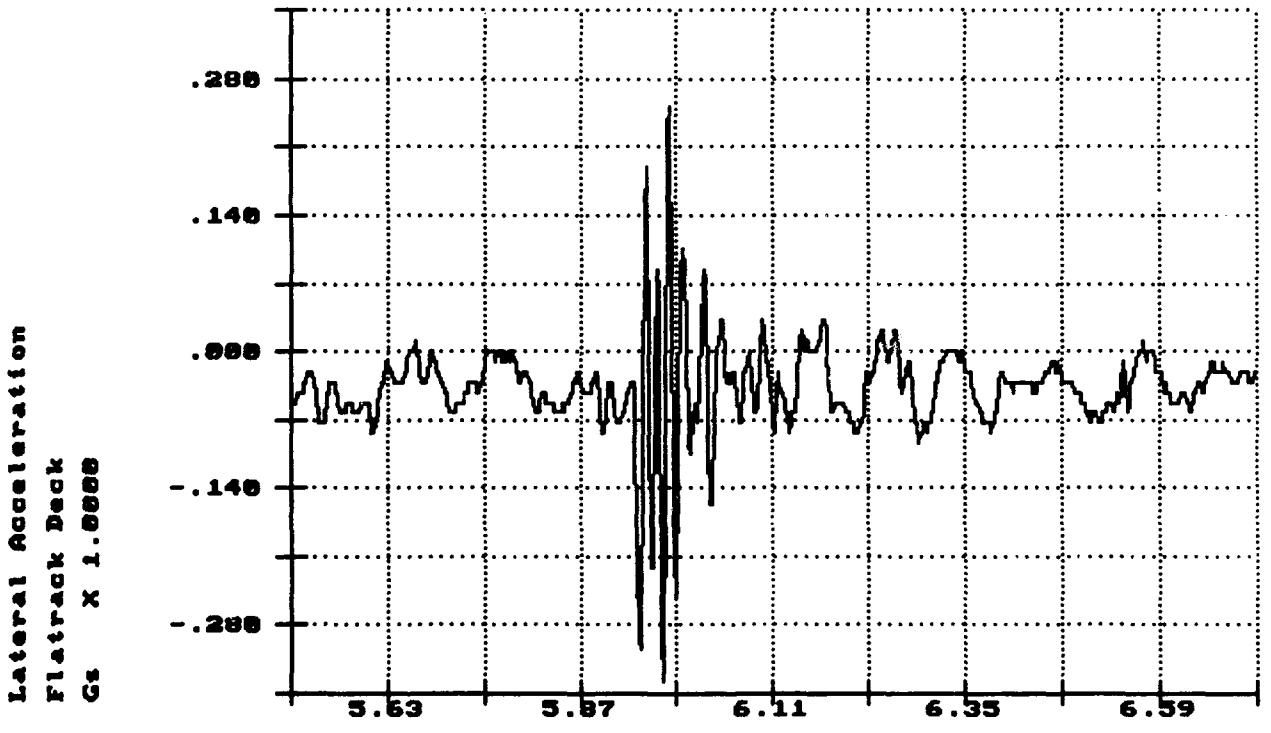
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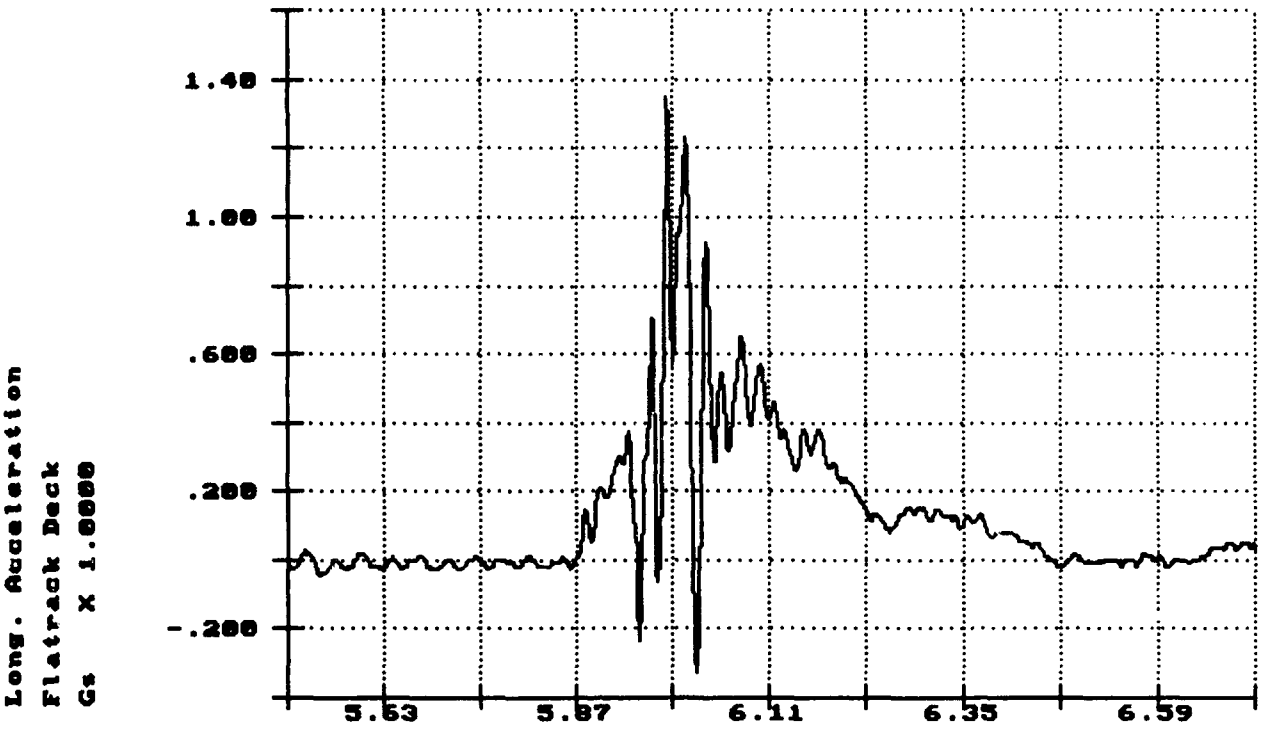
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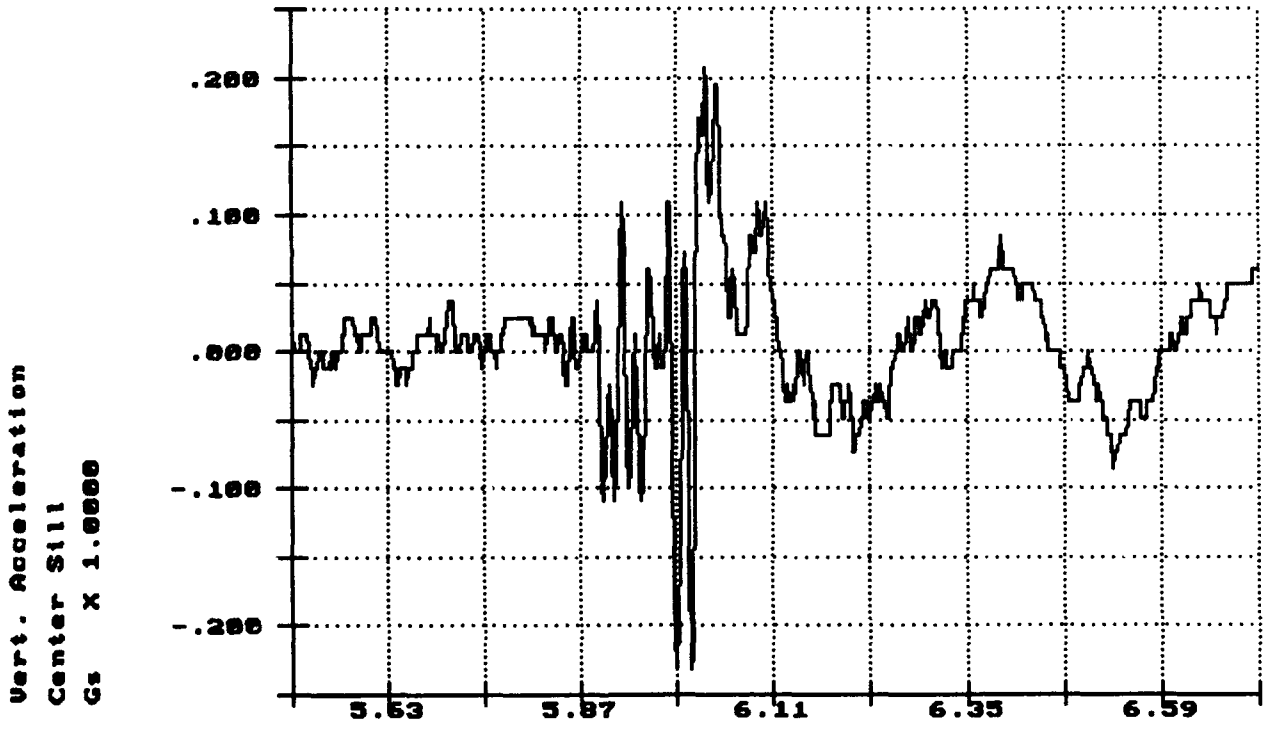
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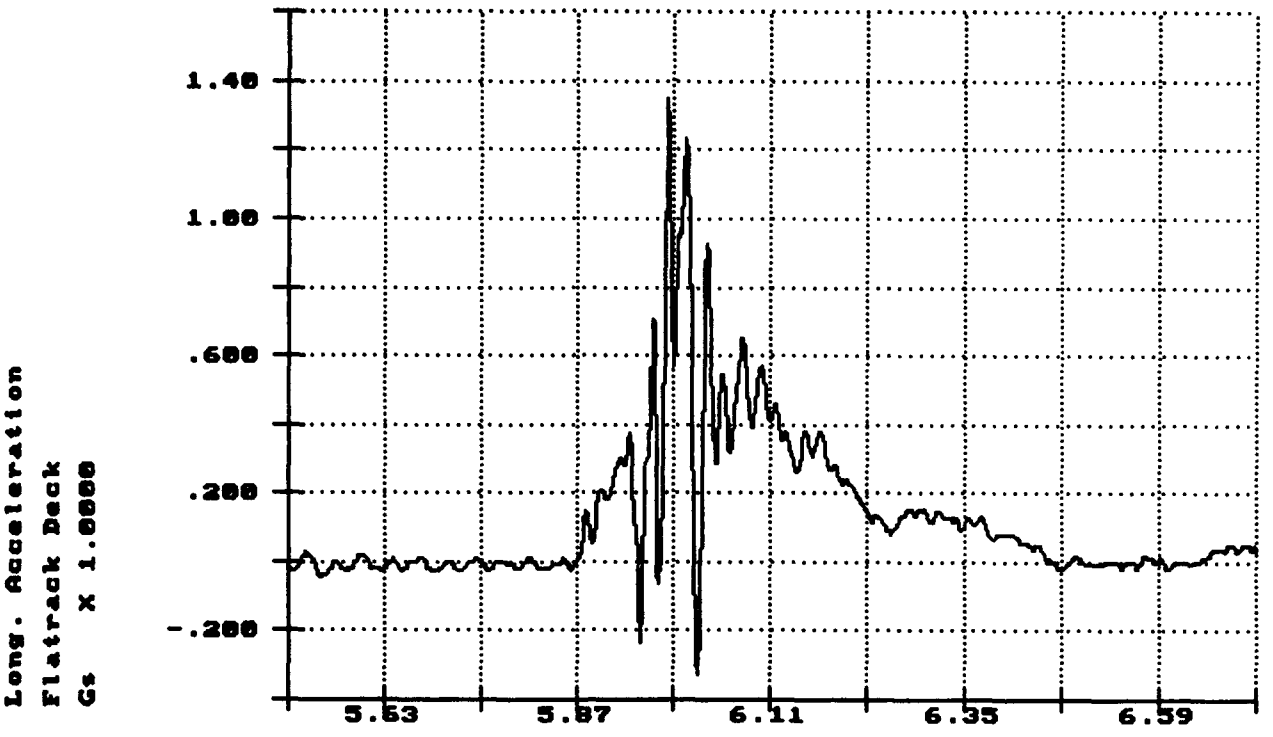
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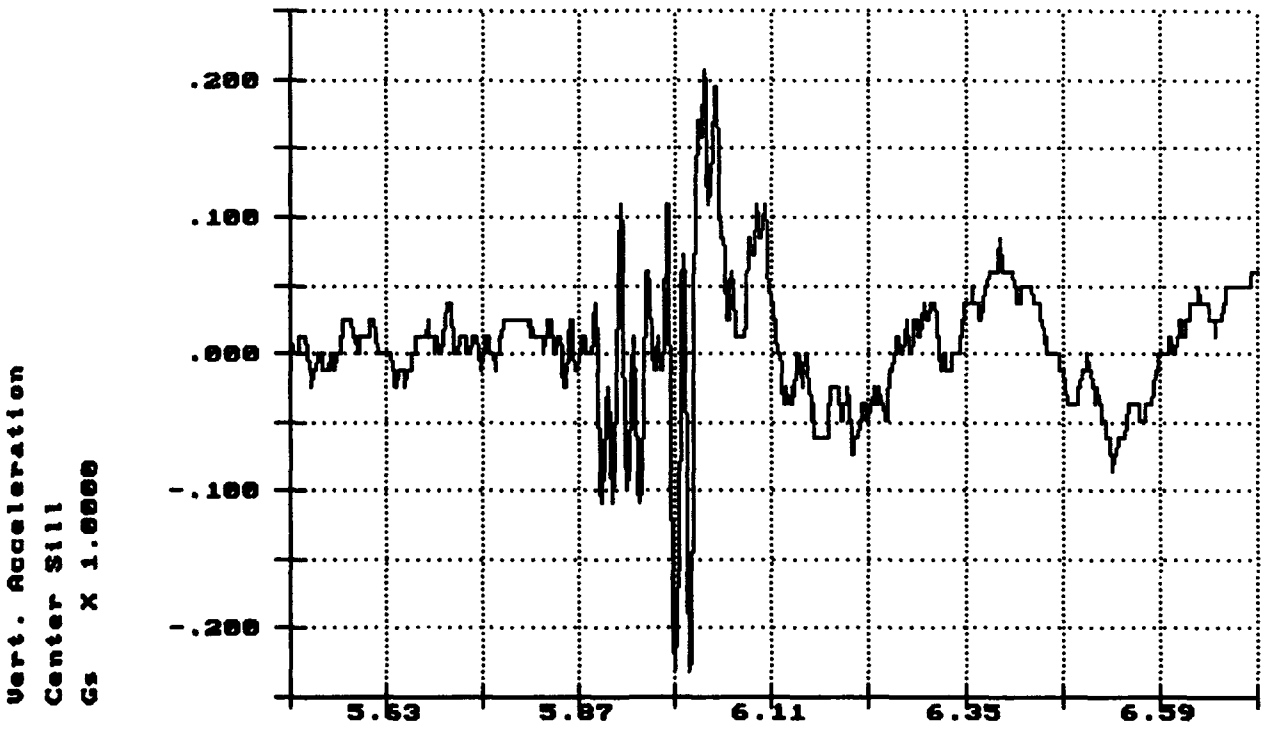
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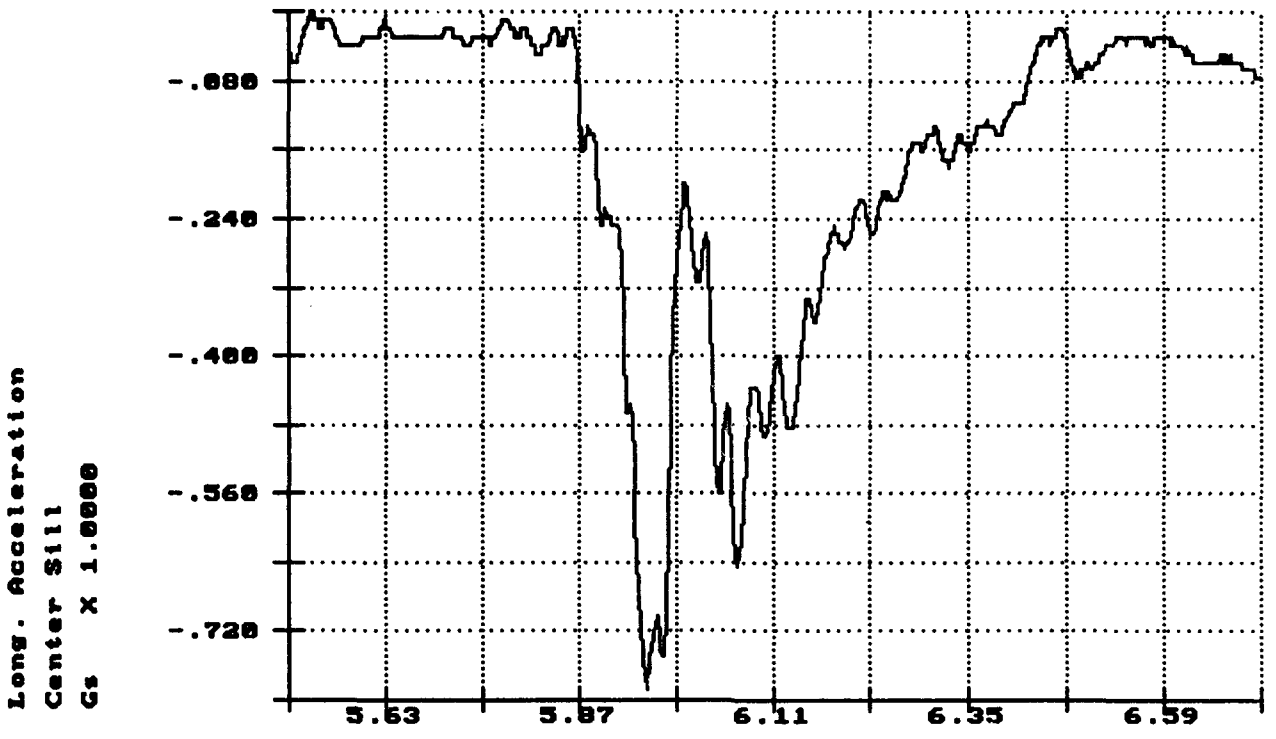
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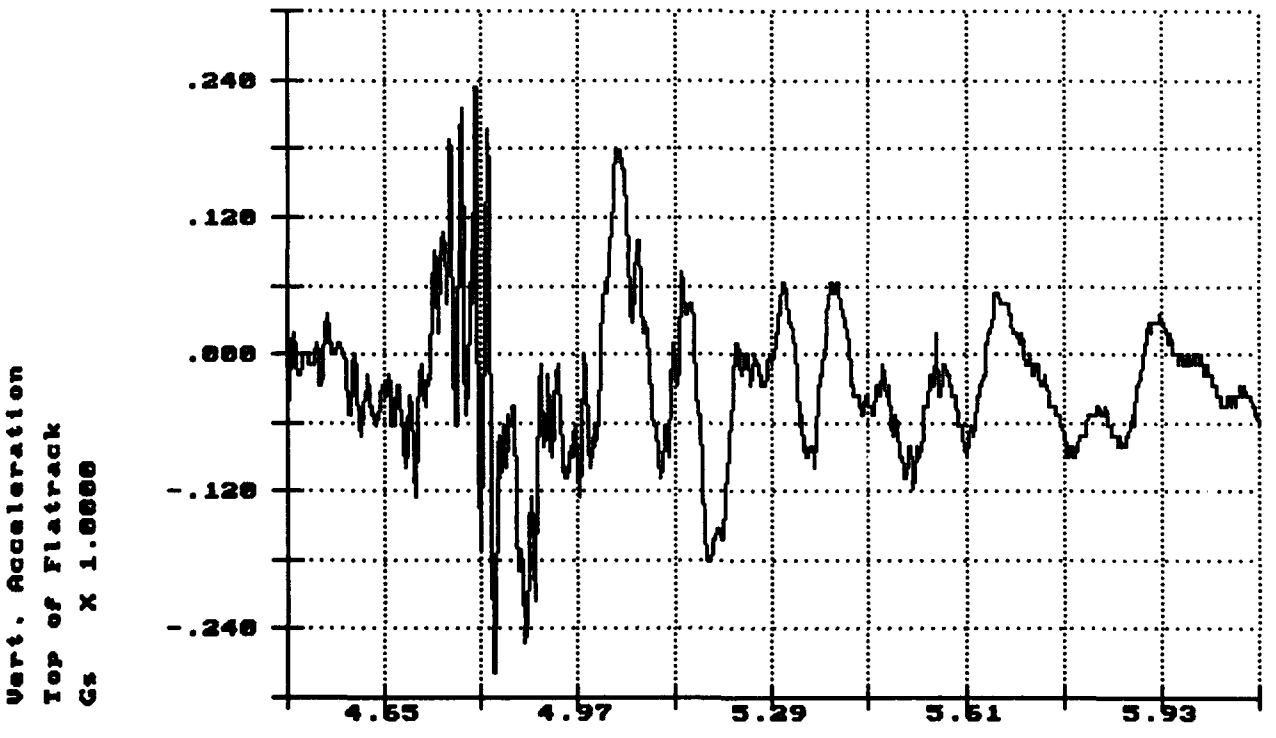
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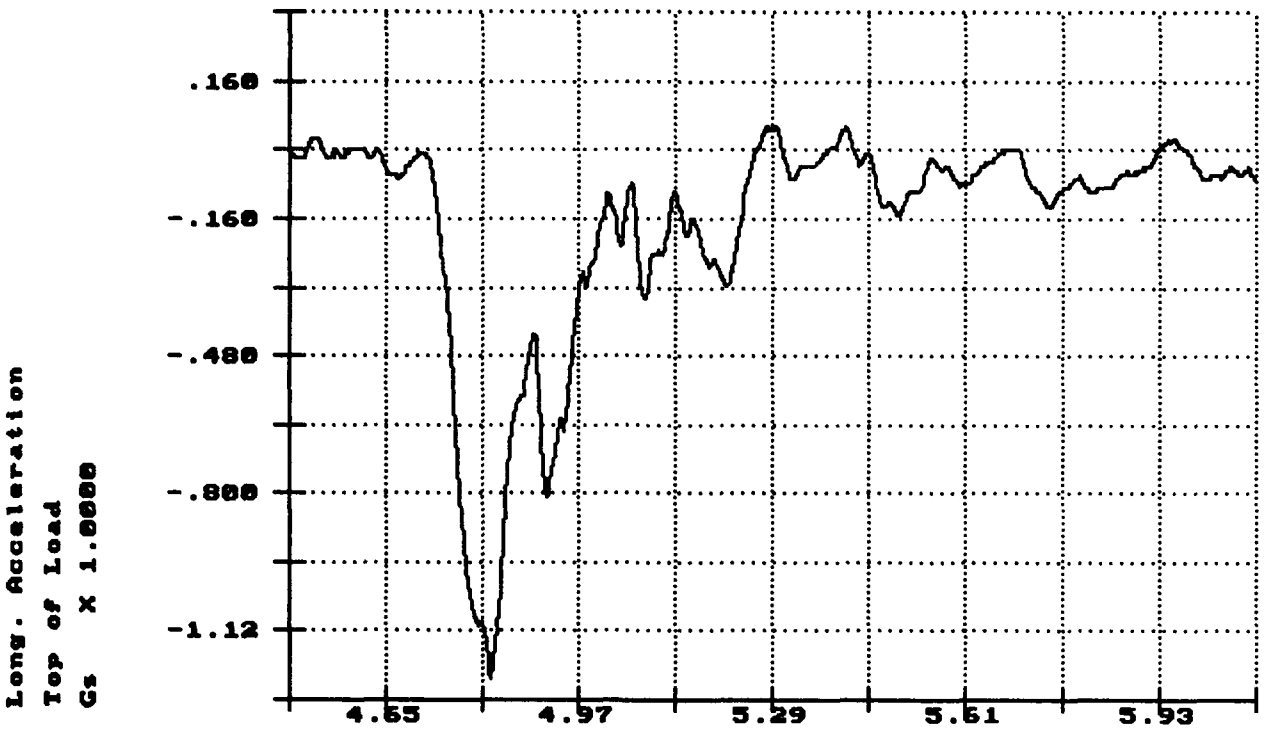
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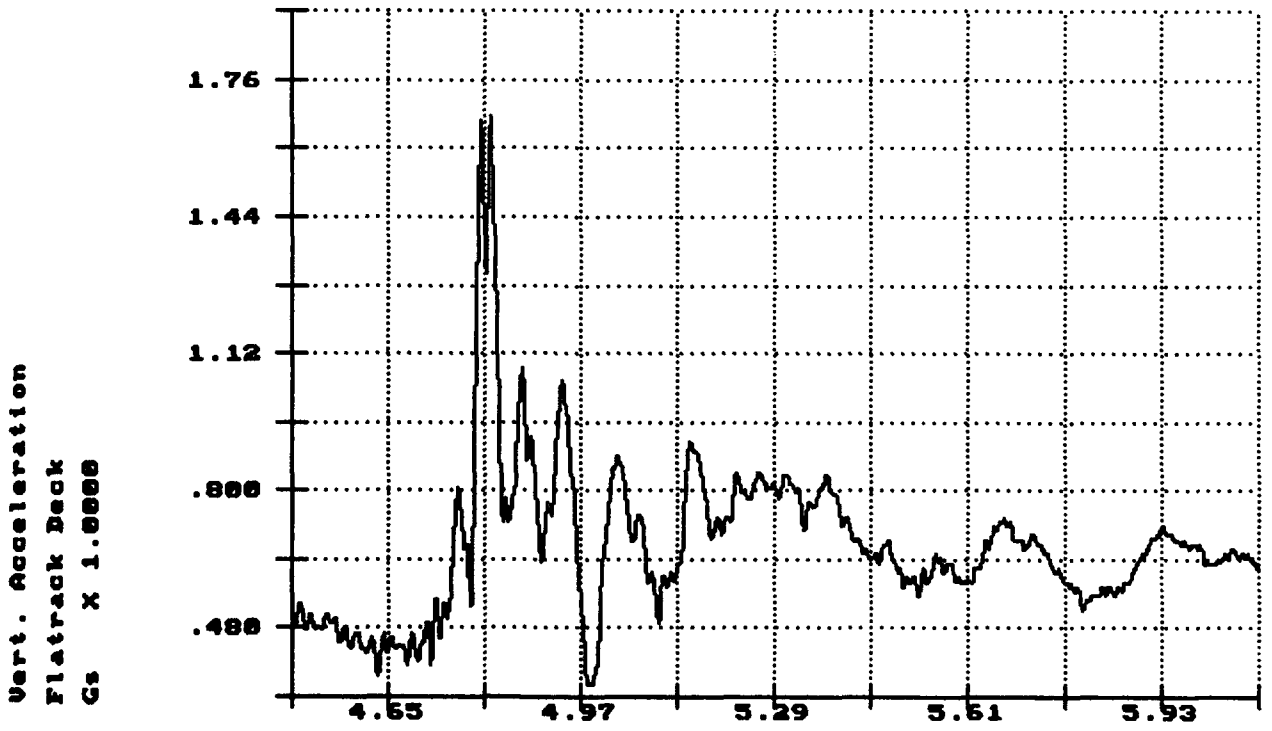
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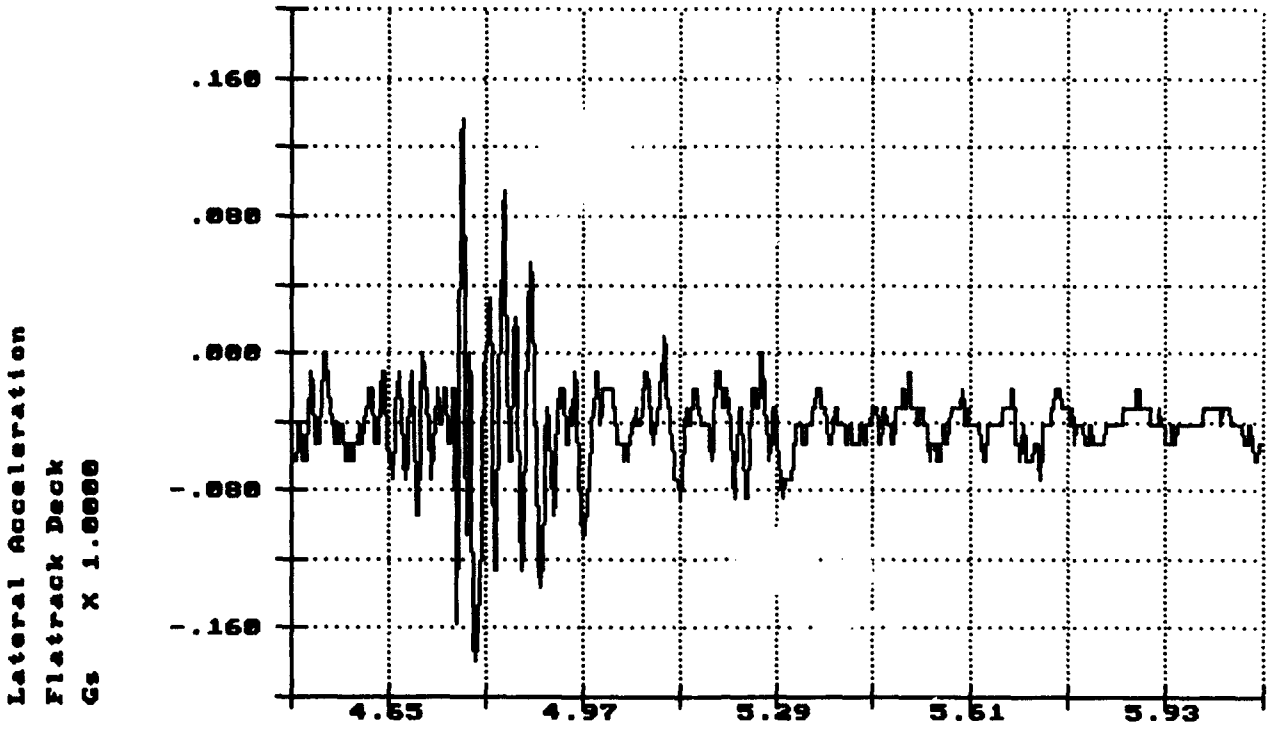
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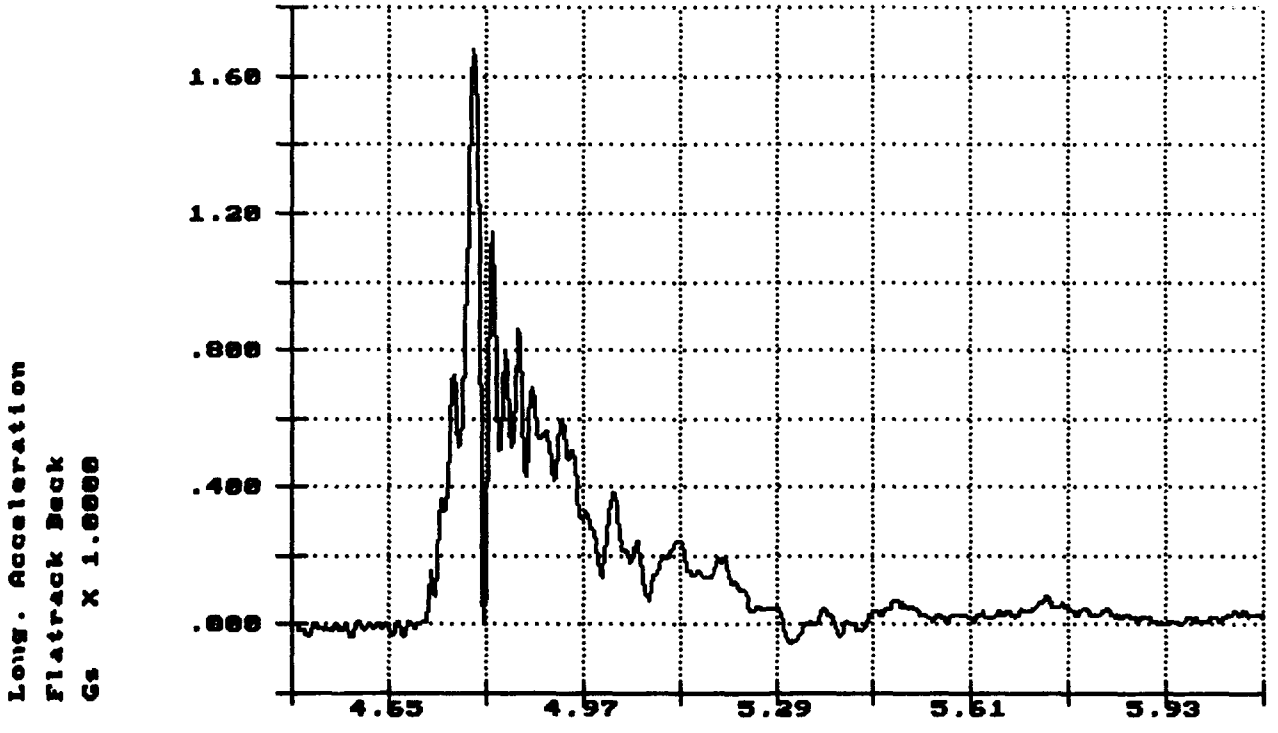
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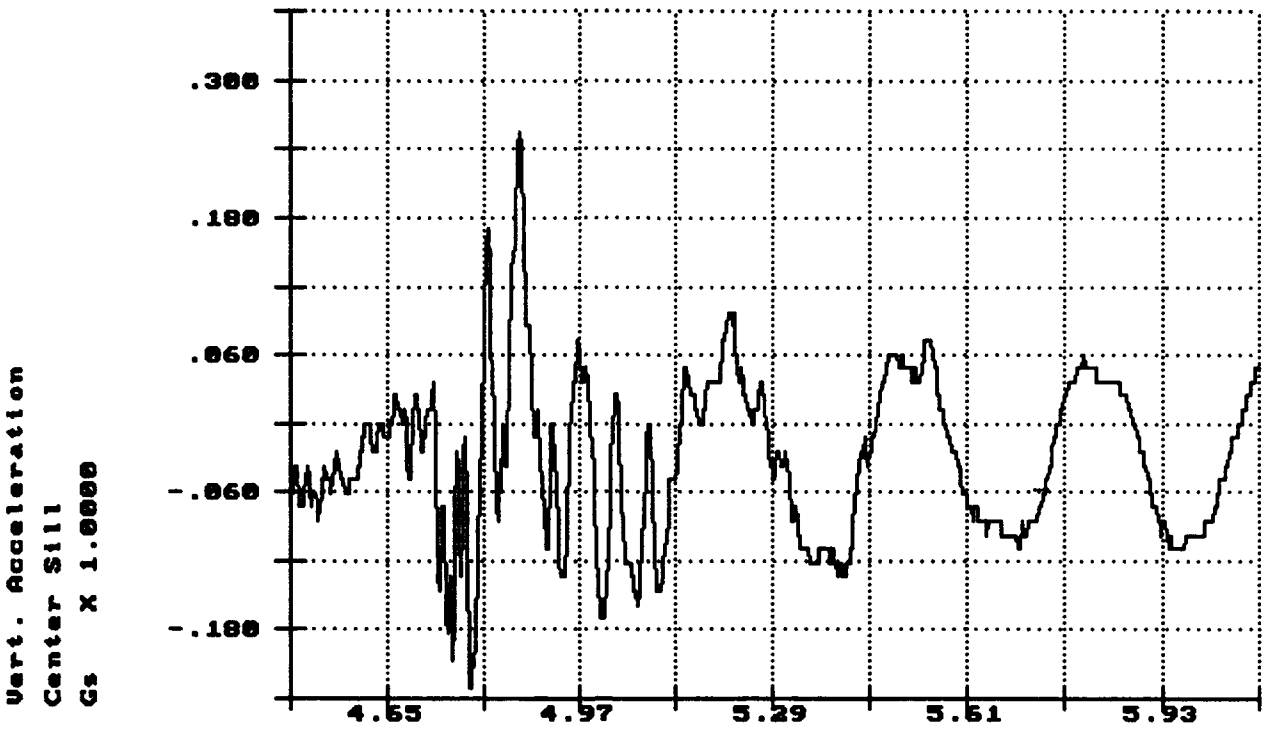
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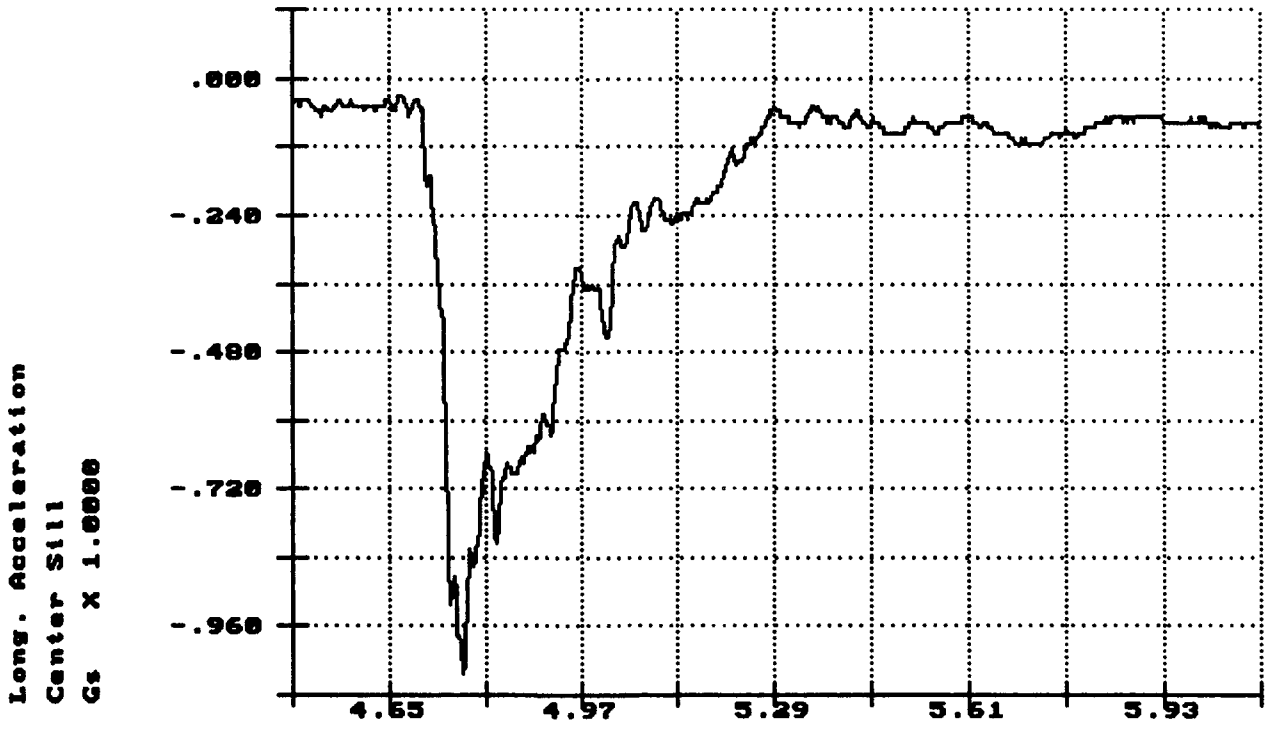
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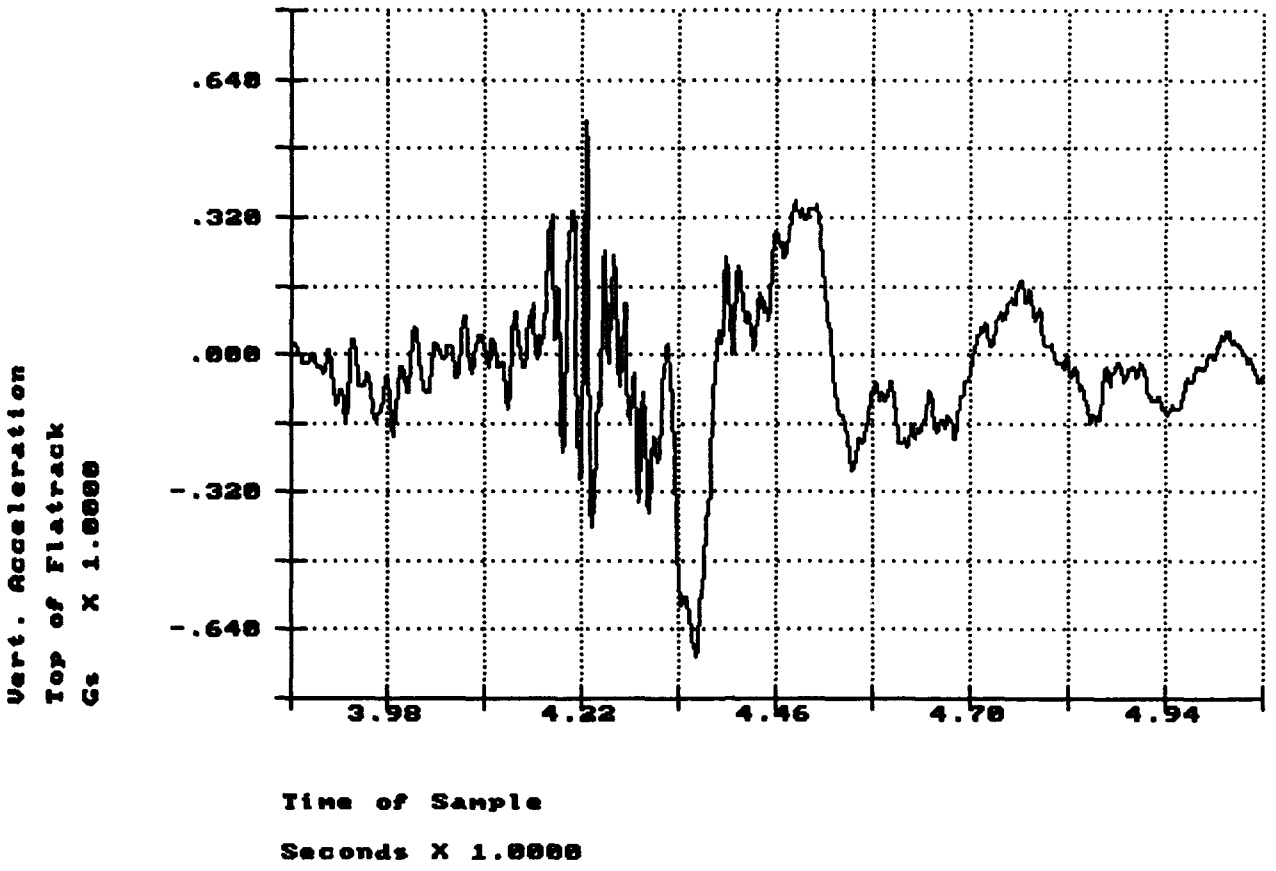
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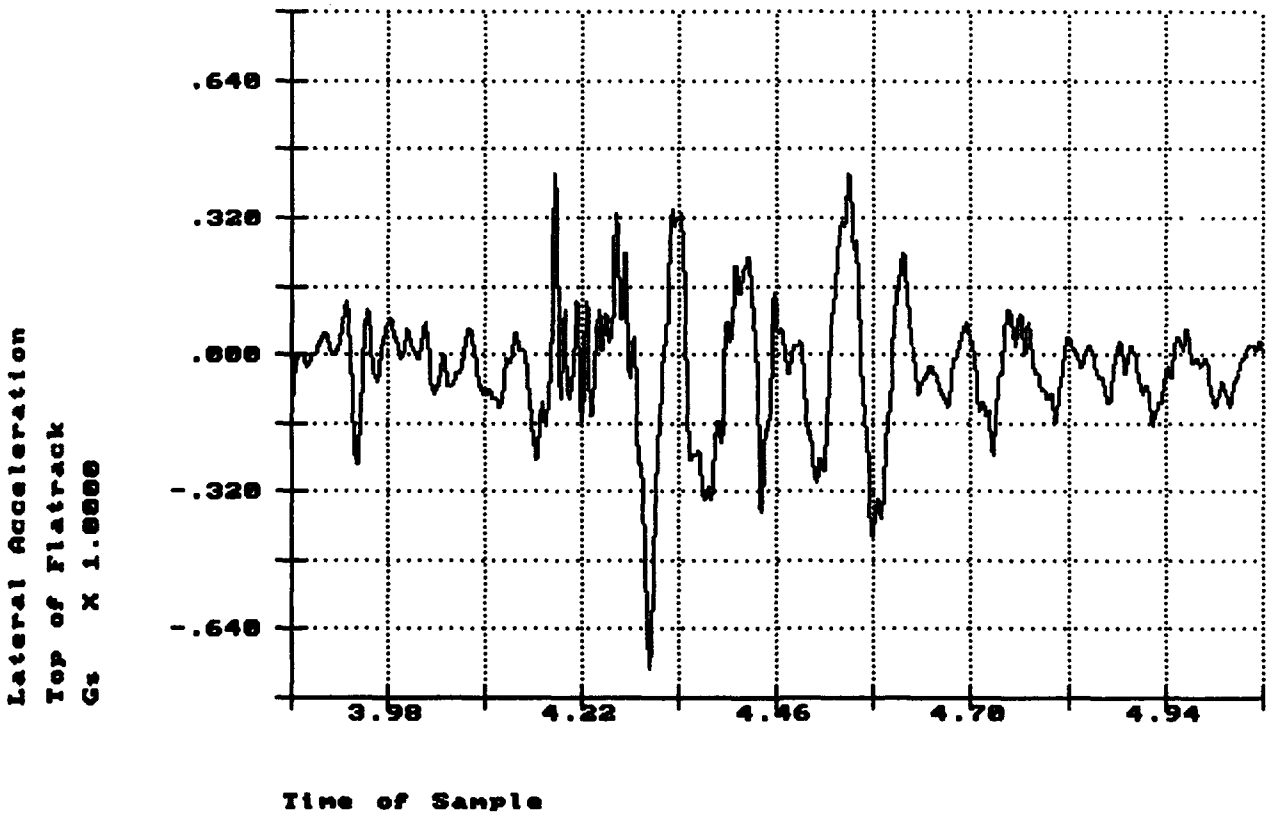
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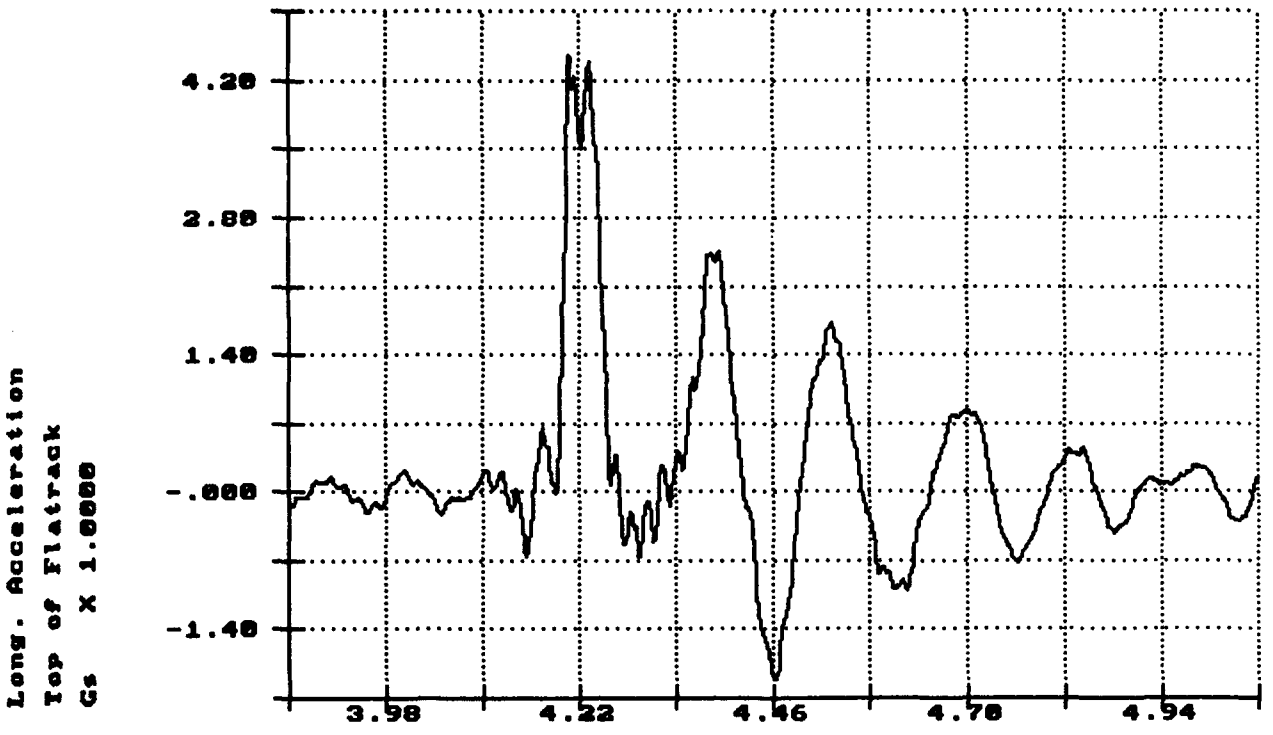
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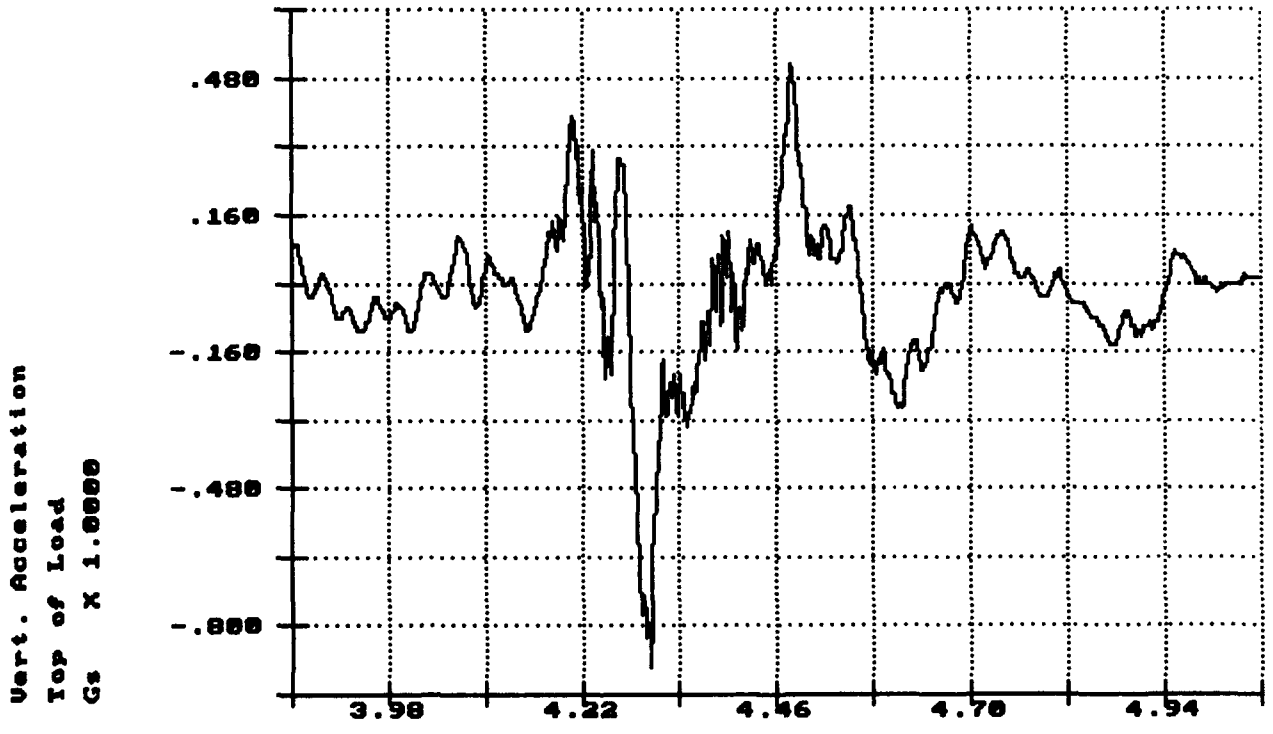
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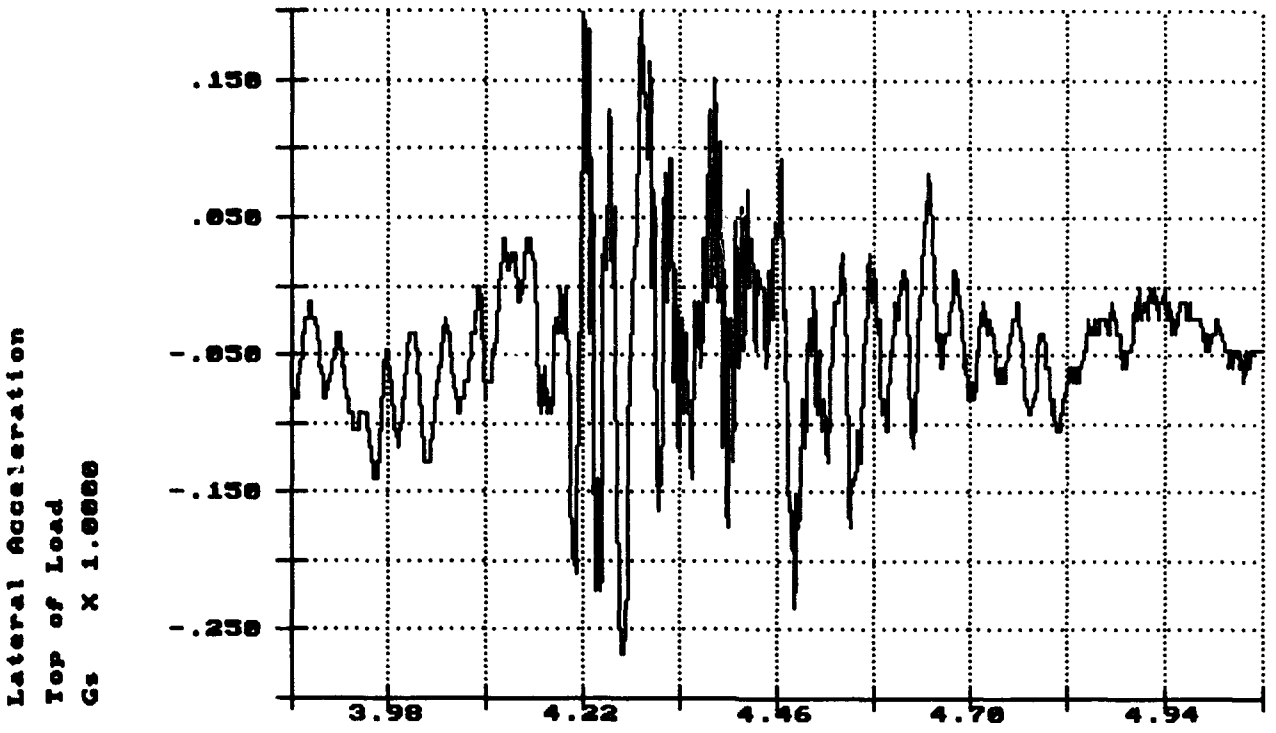
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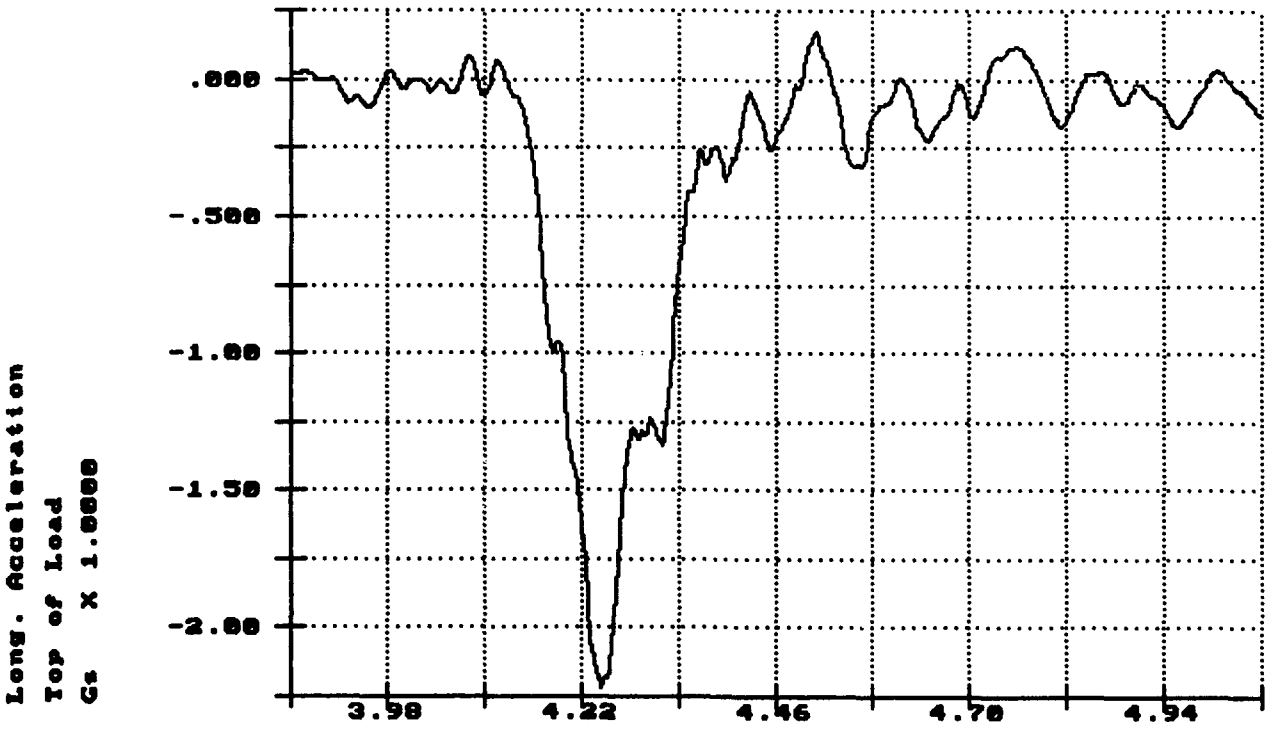
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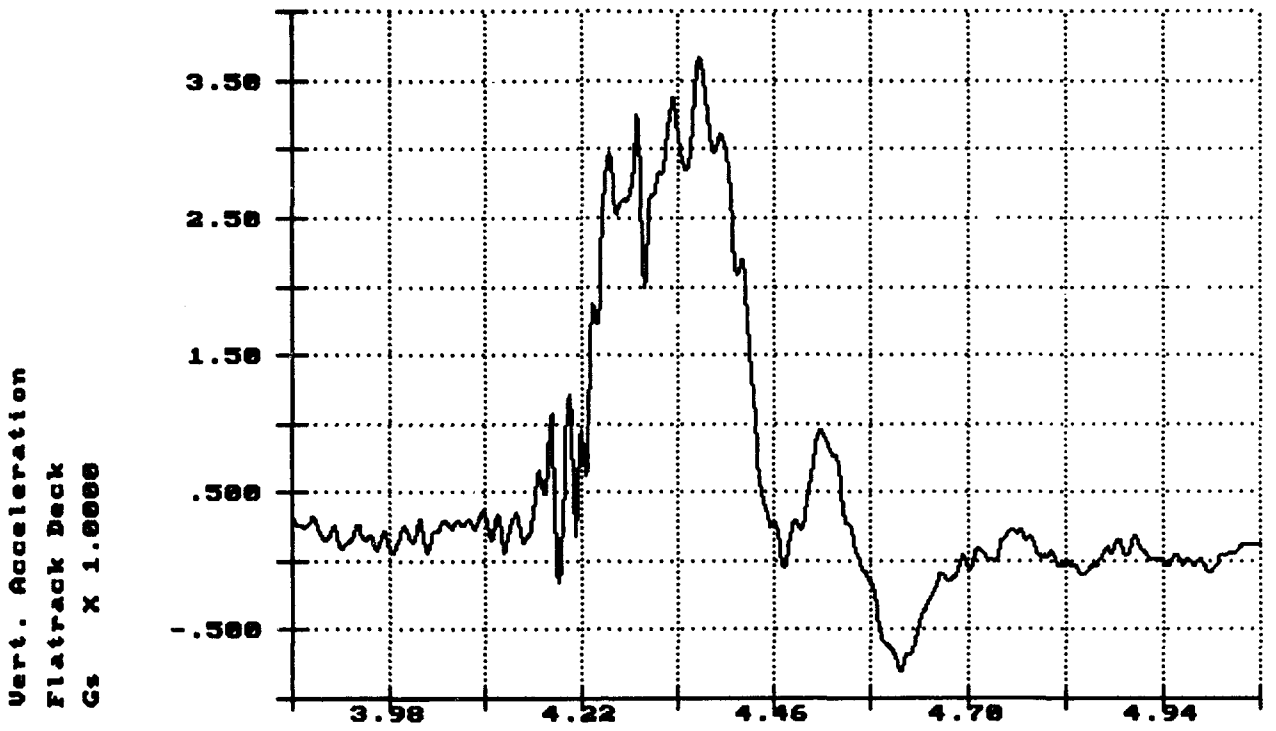
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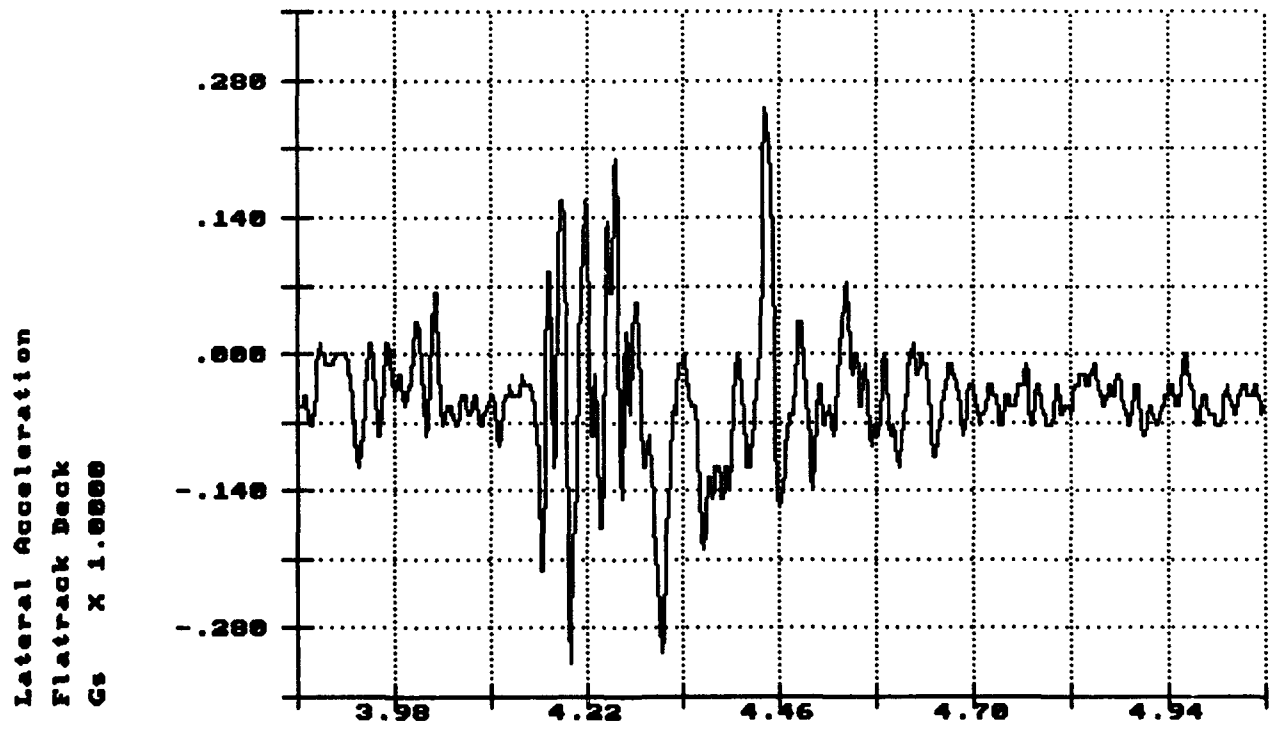
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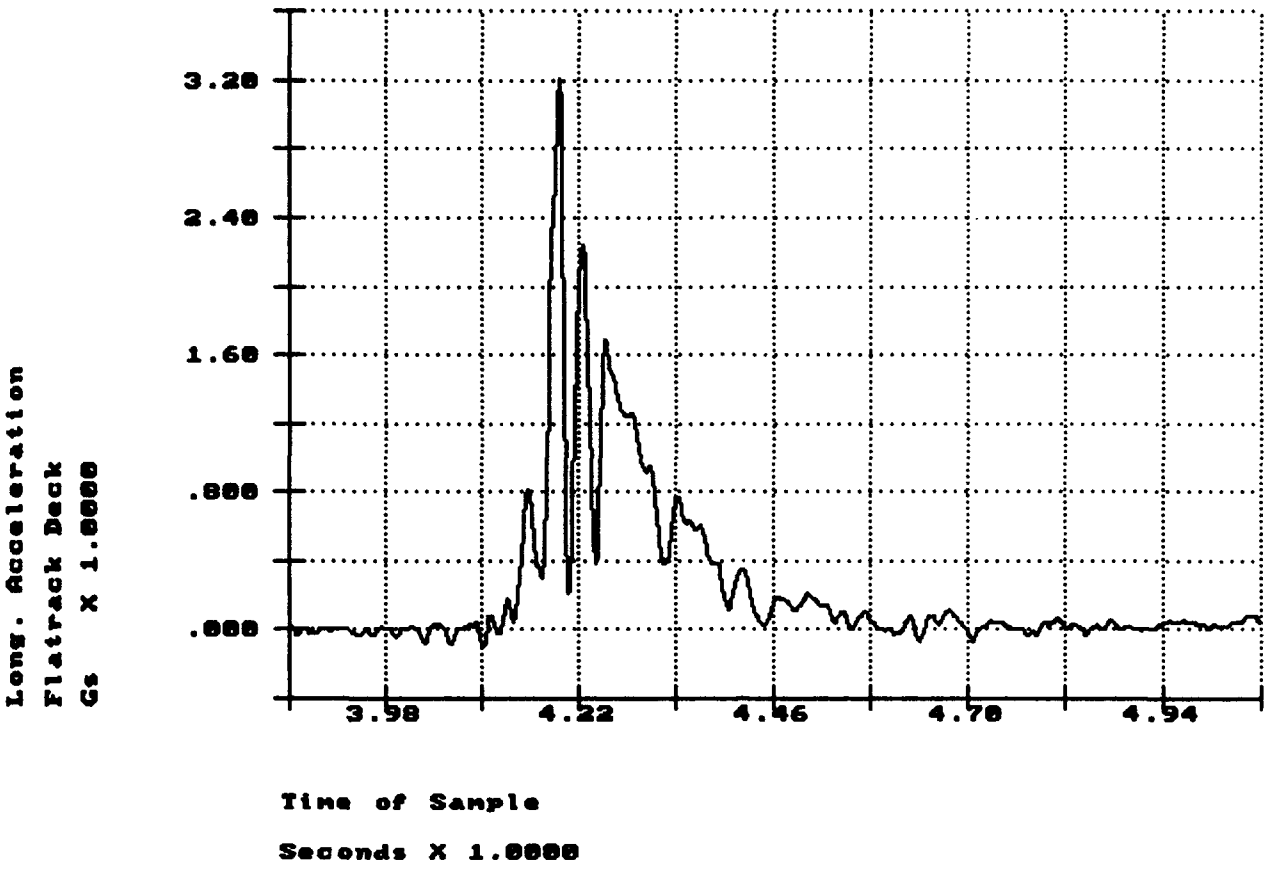
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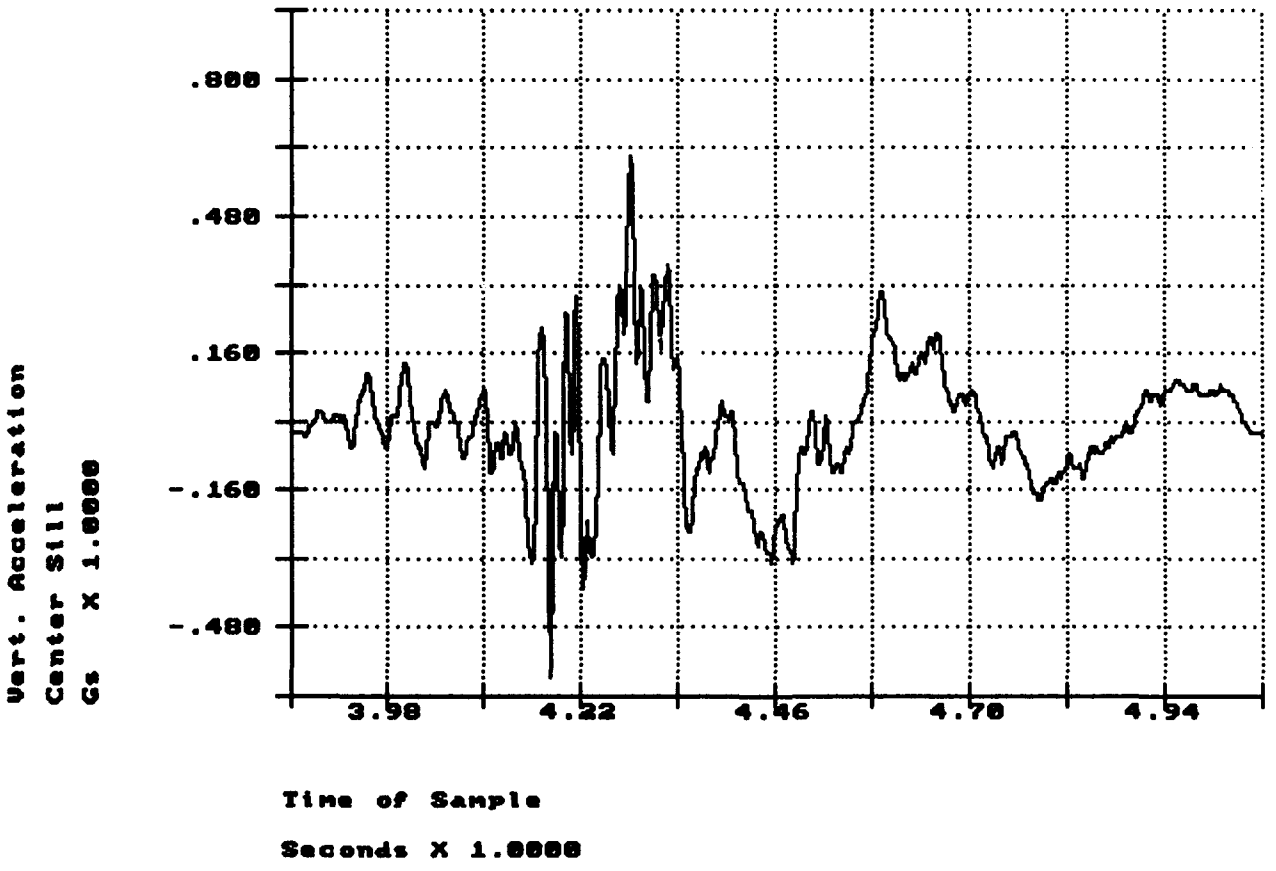
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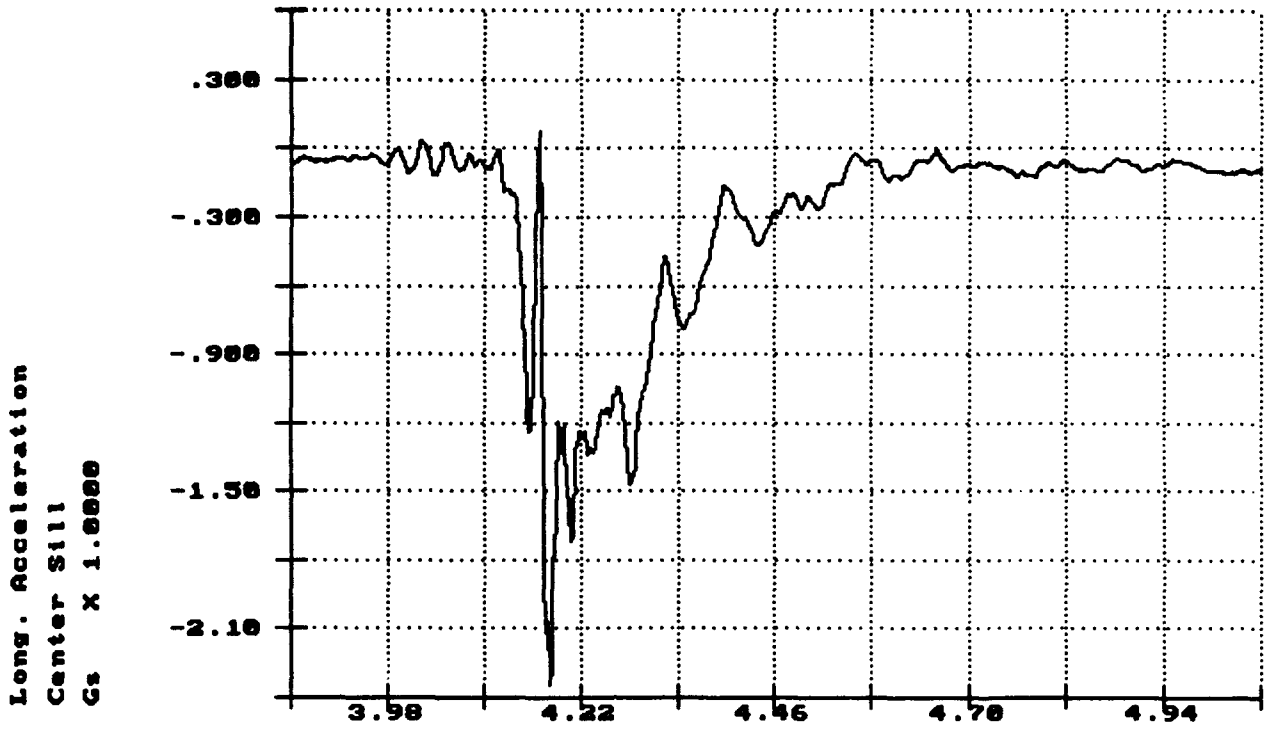
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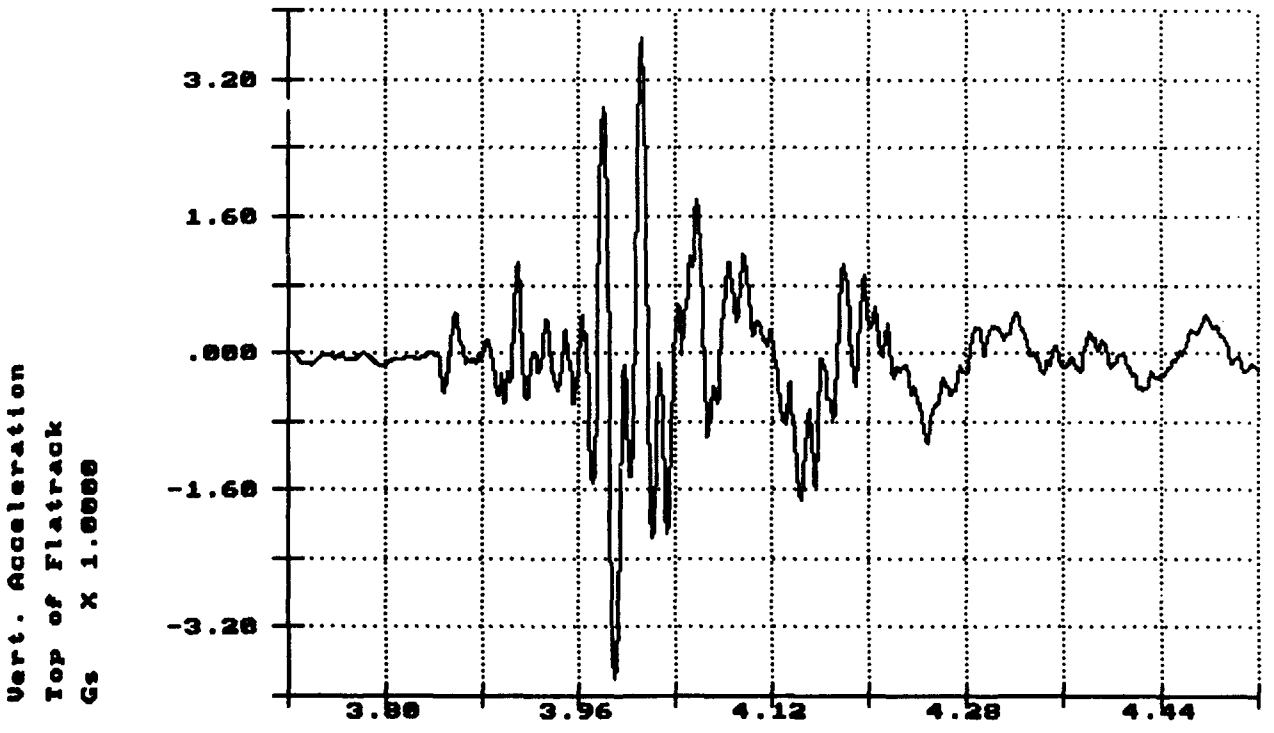
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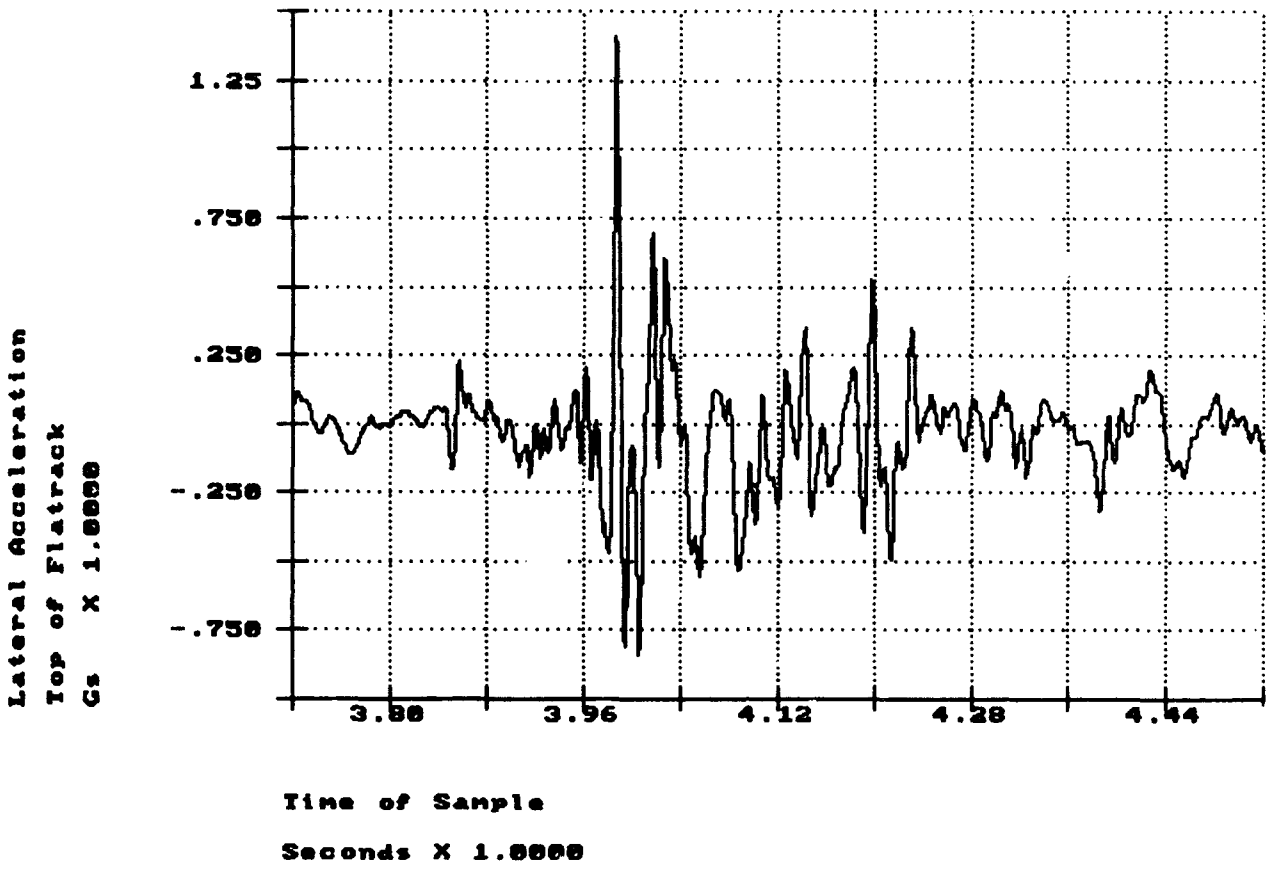
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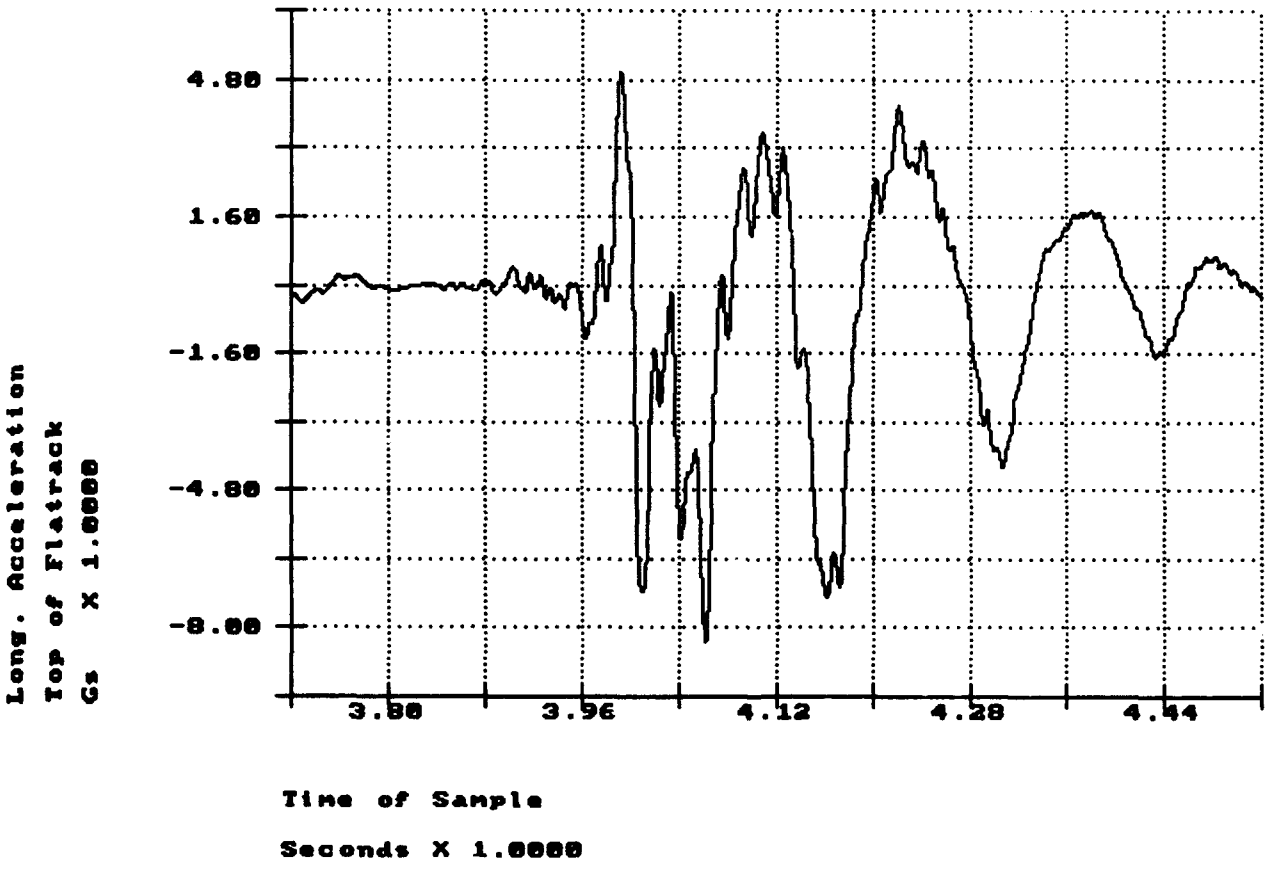
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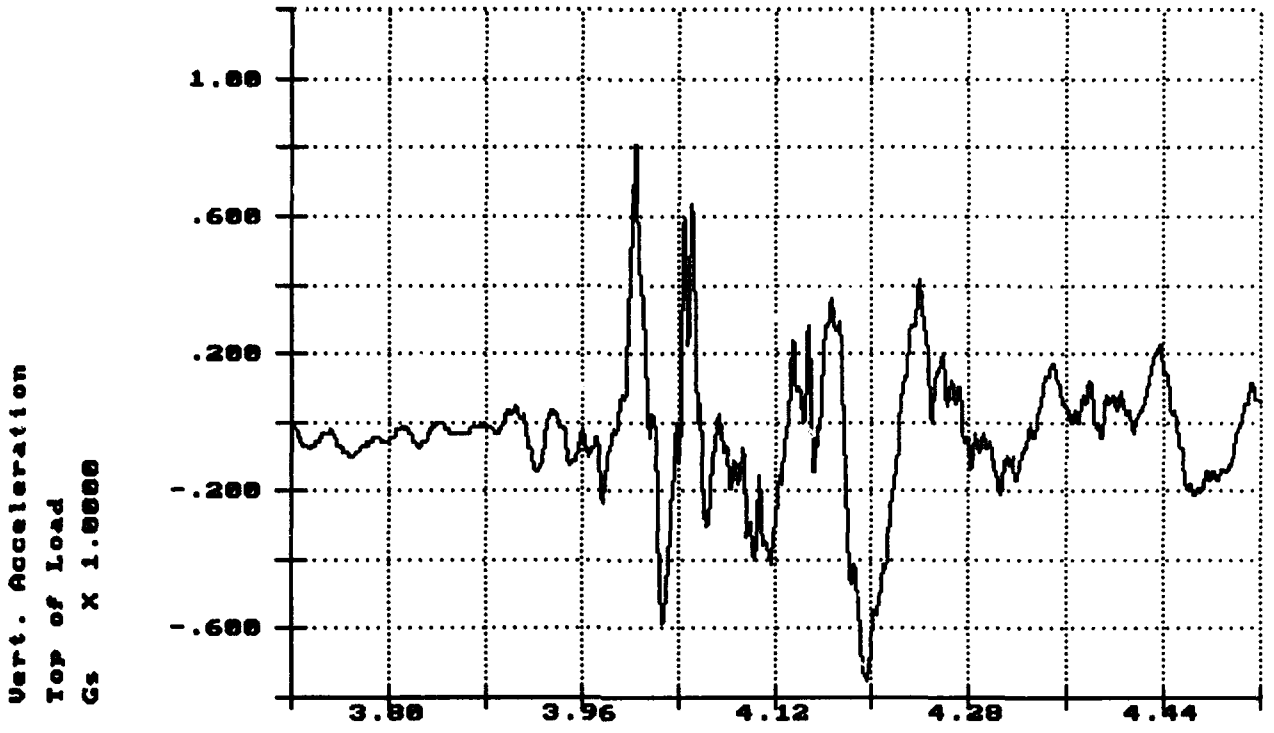
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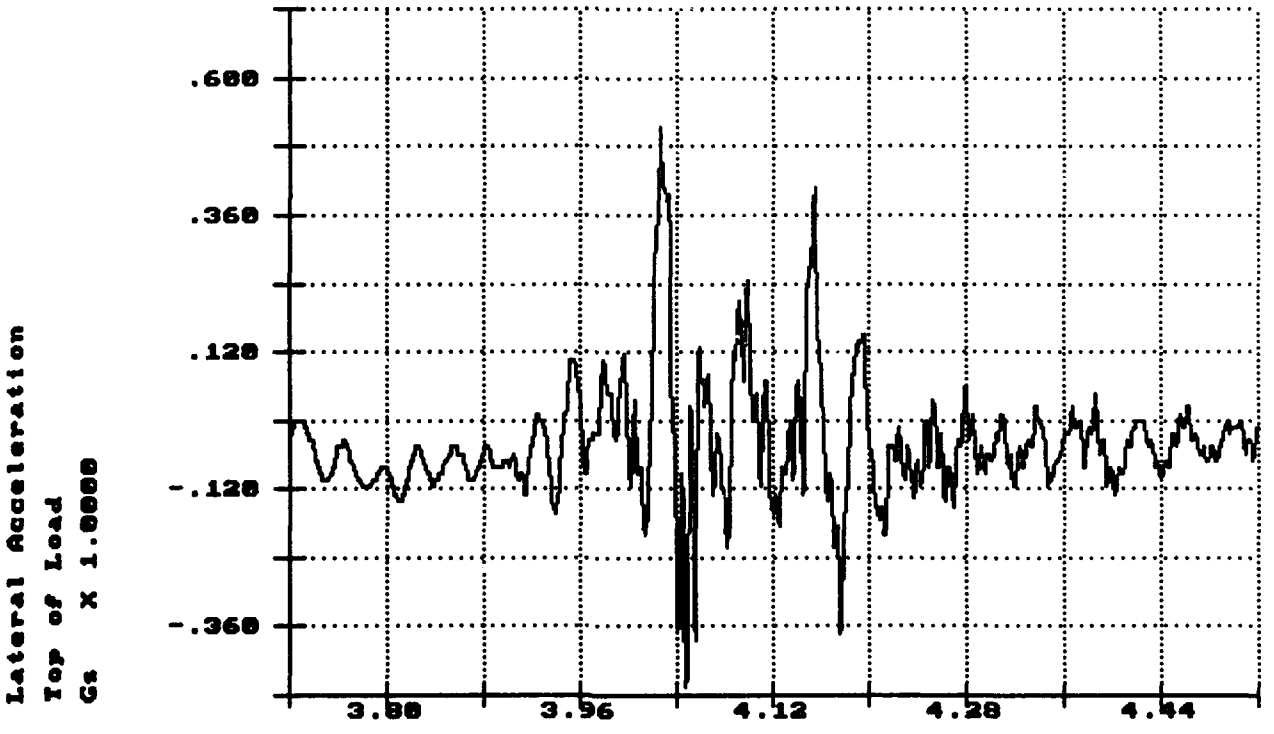
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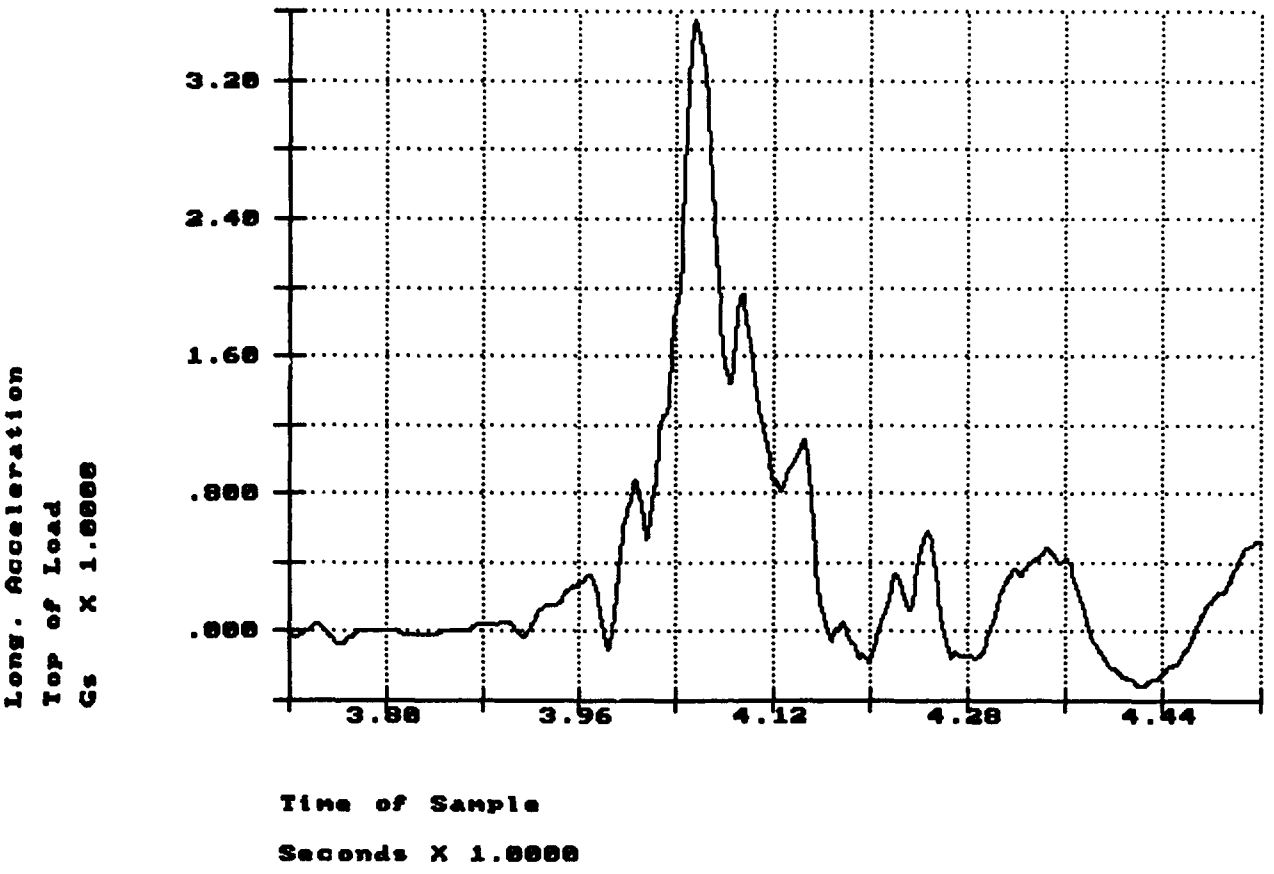
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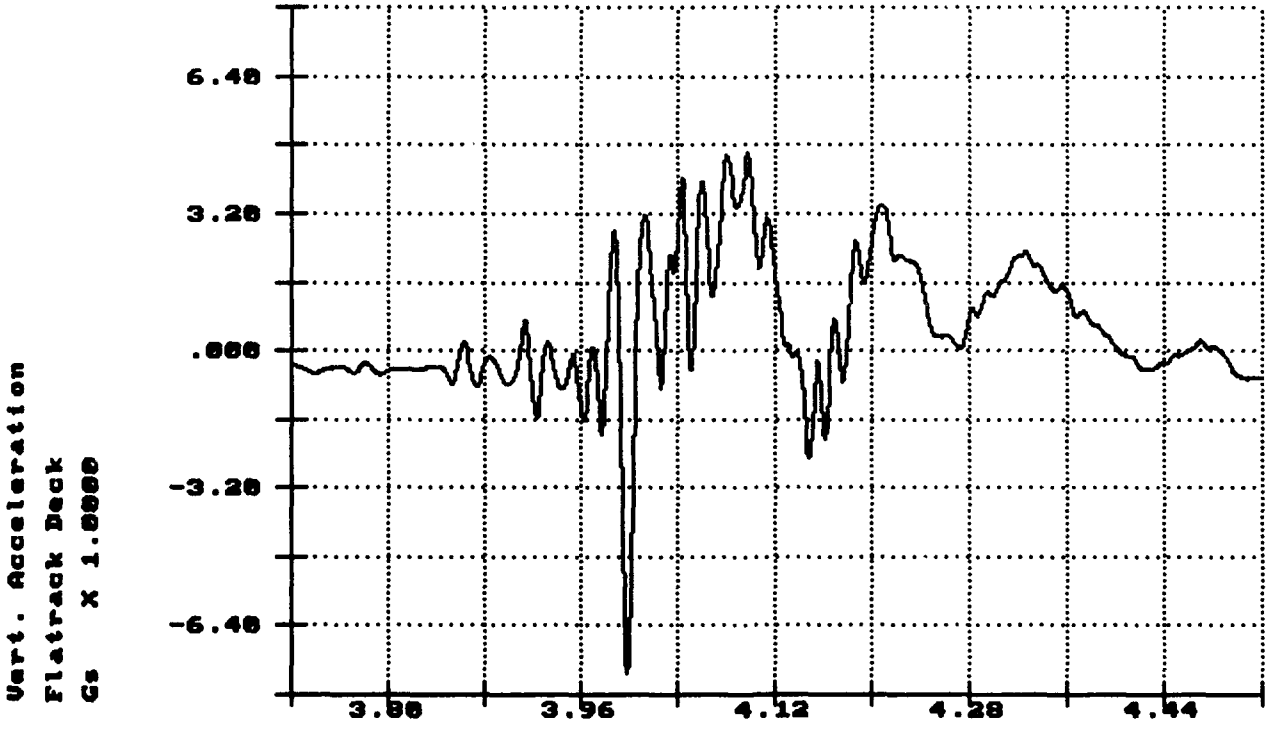
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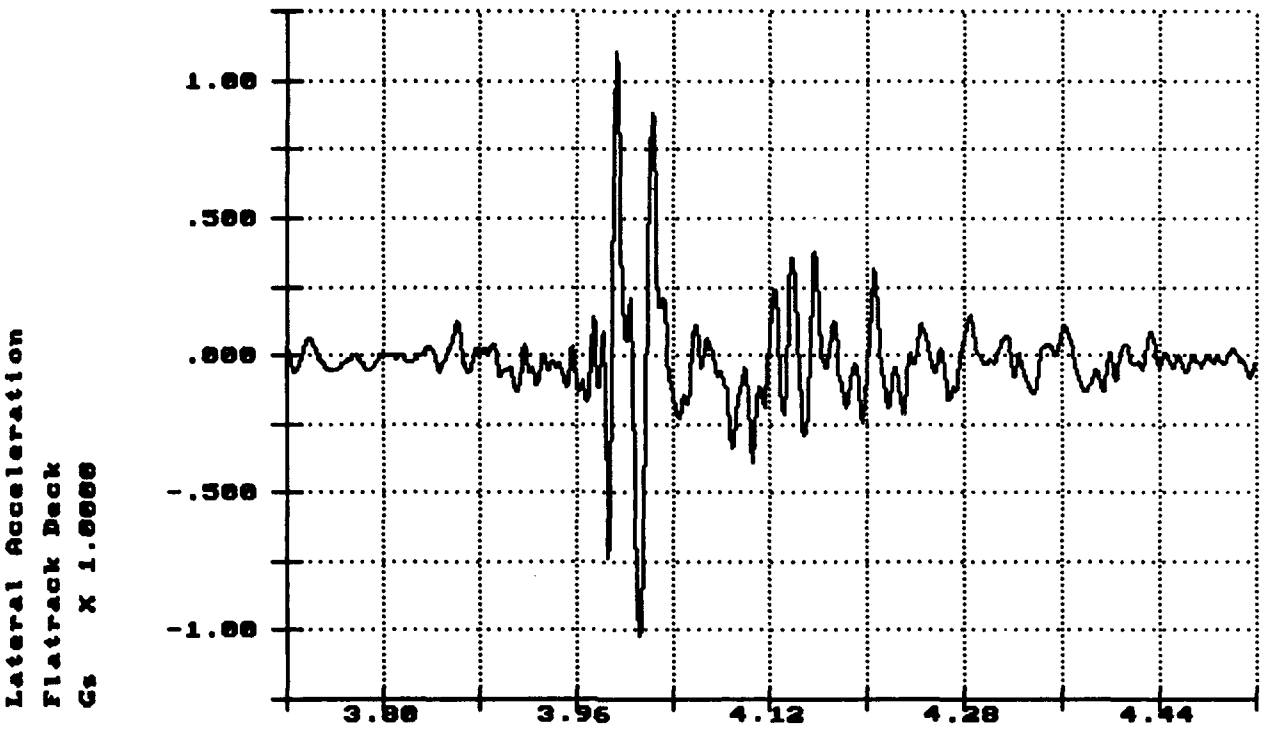
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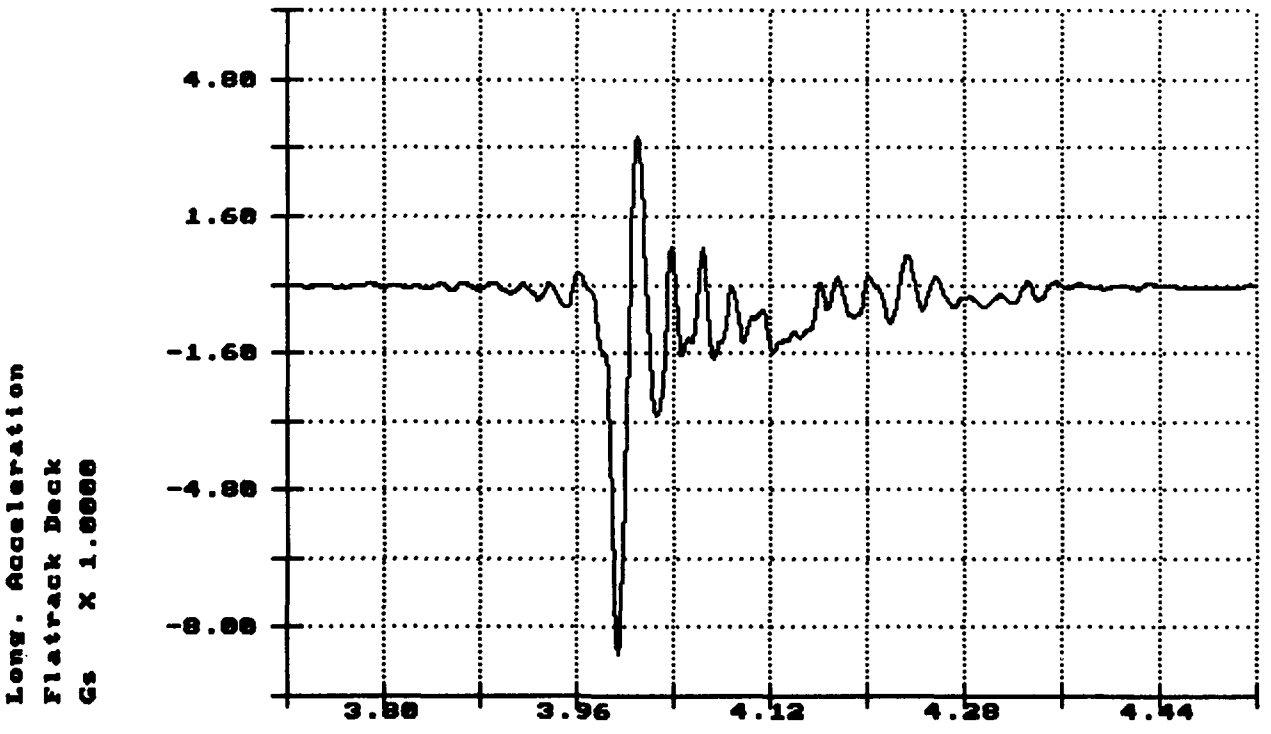
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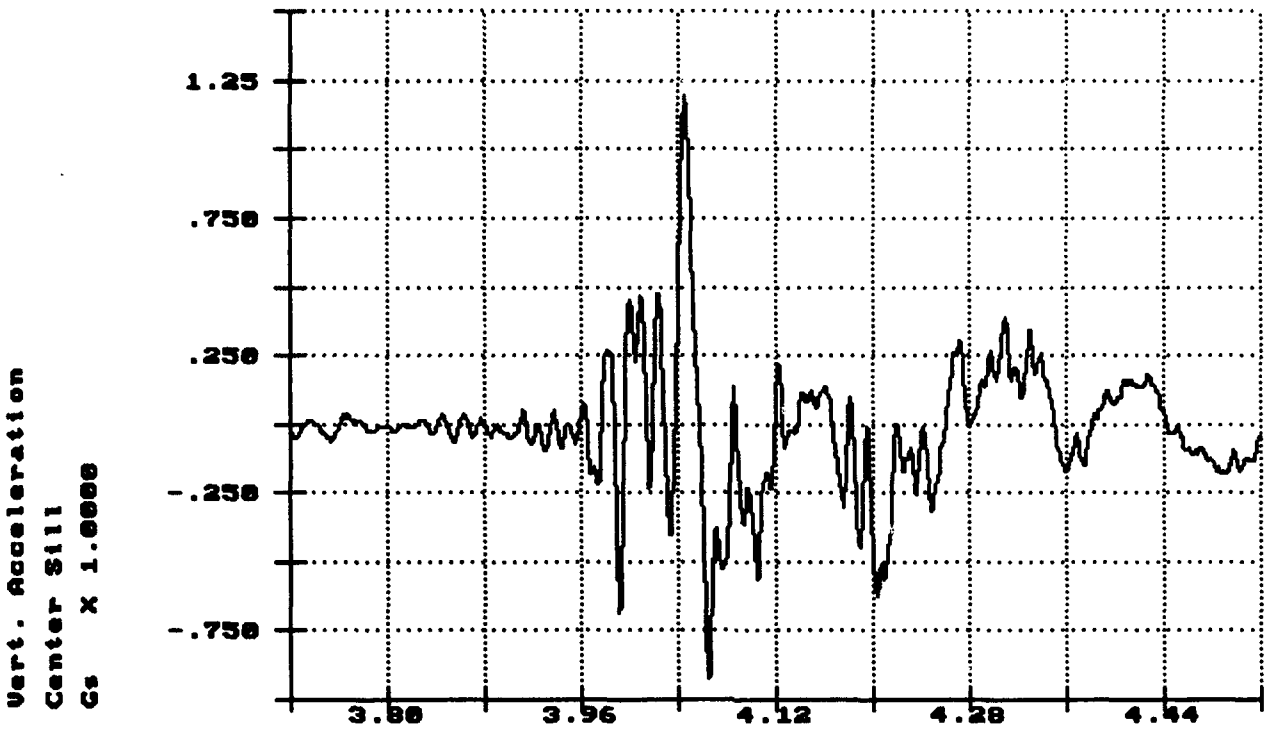
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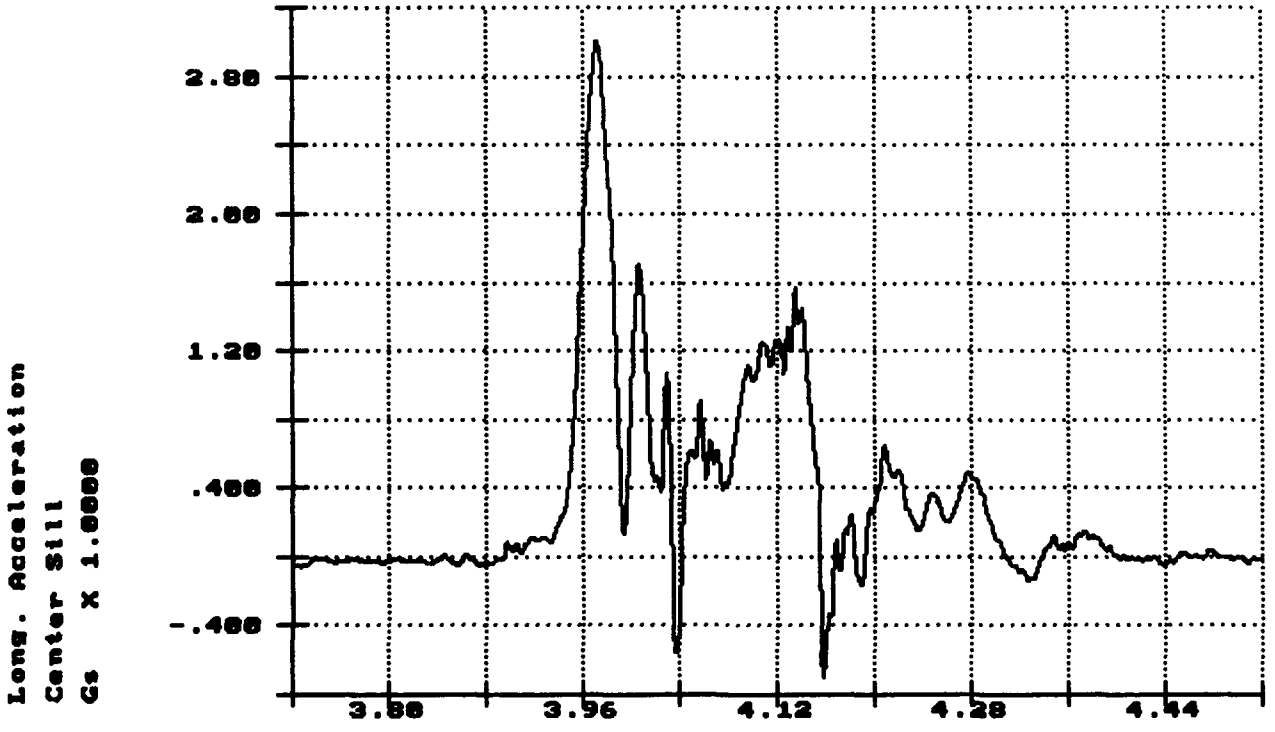
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R.I. of PLS Flatracks, Impact 4: 8.82MPH Dec 06 11:19:09 1993



R.I. of PLS Flatracks, Impact 4: 8.82MPH Dec 06 11:19:09 1993



TEST NO. 12

RAIL IMPACT DATA

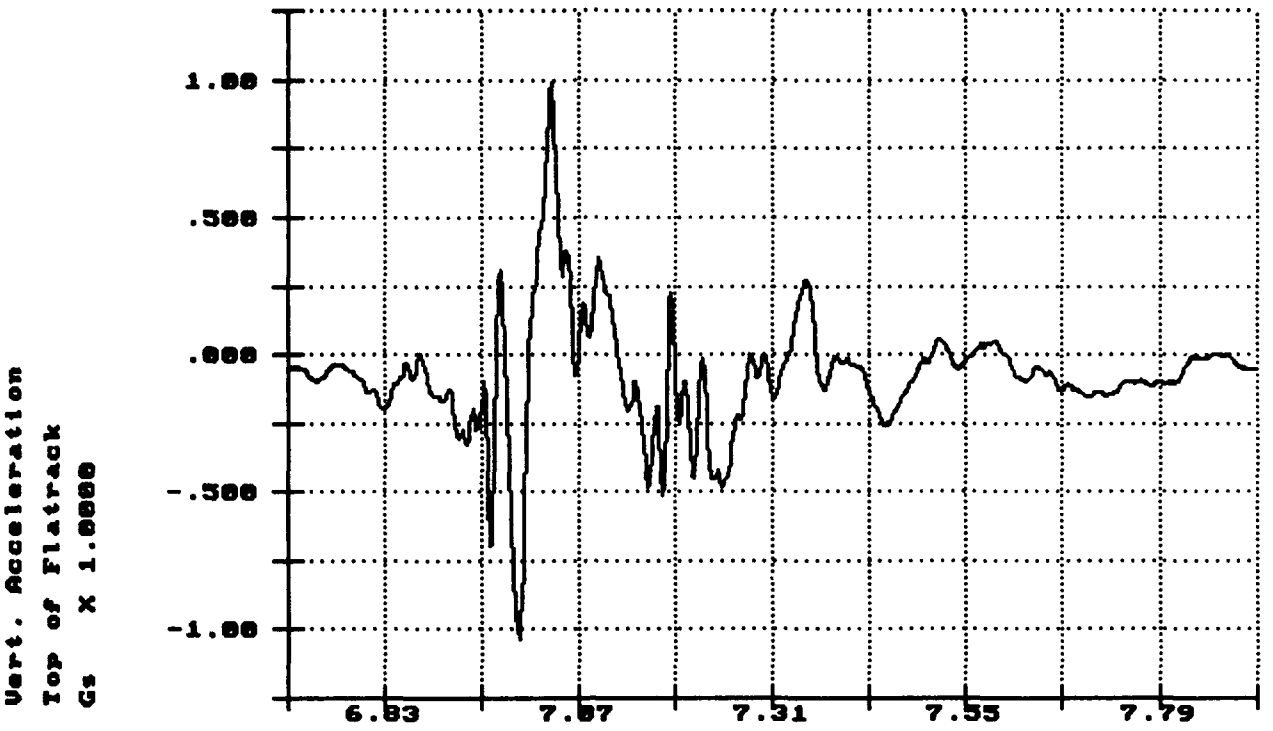
Test No.: 12 Date: 6 December 1993

Specimen Load: EPF with MLRS pods on a TOFC railcar.

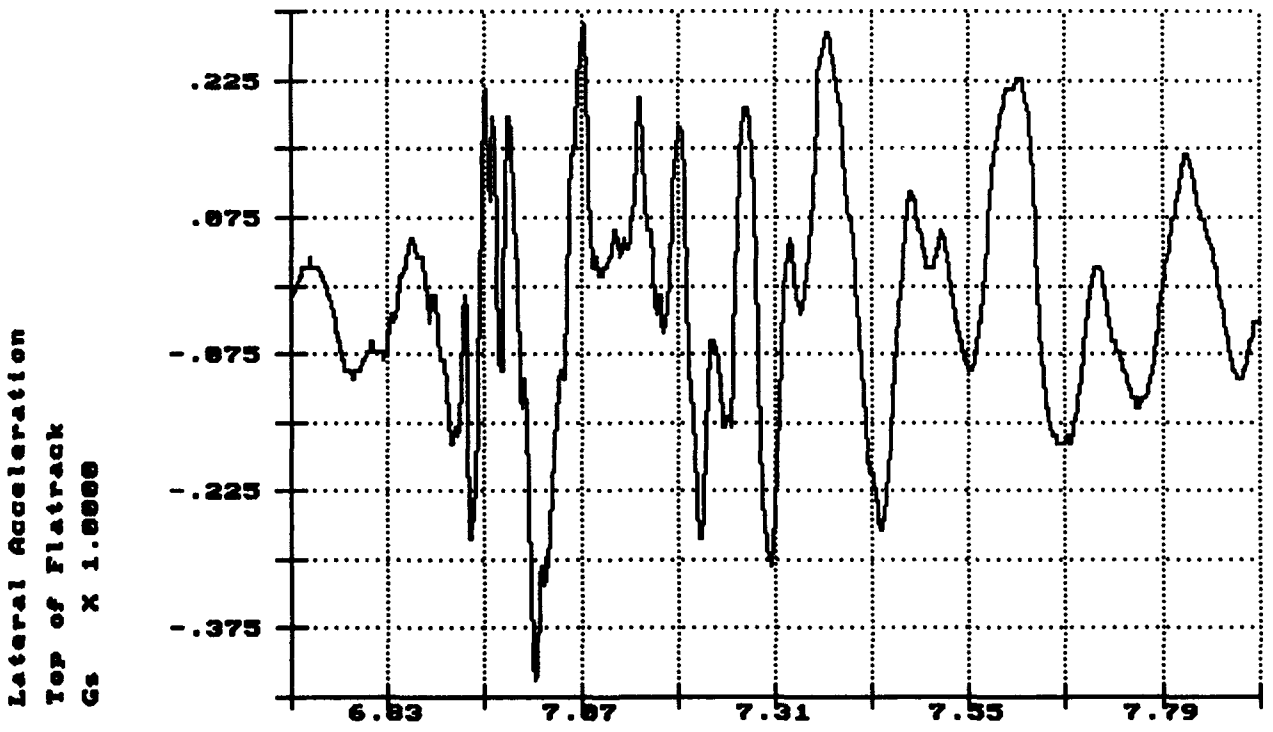
Flatcar No.: TTWX 978622	Lt. Wt.:	73,000
Trailer Chassis No.: ISCZ 164587	Wt.:	6,540
EPF No. 2	Wt.:	7,500
Lading, Four MLRS Pods	Wt.:	22,000
Trailer Chassis No.: 5394	Wt.:	6,500
EPF No. 1	Wt.:	7,500
Lading, Propelling Charge Containers on Wooden Pallets	Wt.:	14,128
	Total Specimen Wt.:	137,168
	Buffer Car (five cars) Wt:	250,000

Impact	End Struck	Velocity	Remarks
1	Rear	4.72	No load movement.
2	Rear	6.58	The 4- by 4-inch struts on the MLRS pods pulled up at the rear (impact end) of the load.
3	Rear	8.33	No change in struts from impact No. 2. The propelling charge containers compacted to yield a 2-inch gap at the forward (bail bar) end of the EPF.
4	Forward	8.72	MLRS had a 1/2-inch void at the rear EPF end wall. Propelling charge container pallets moved 2-inches from the rear end wall.

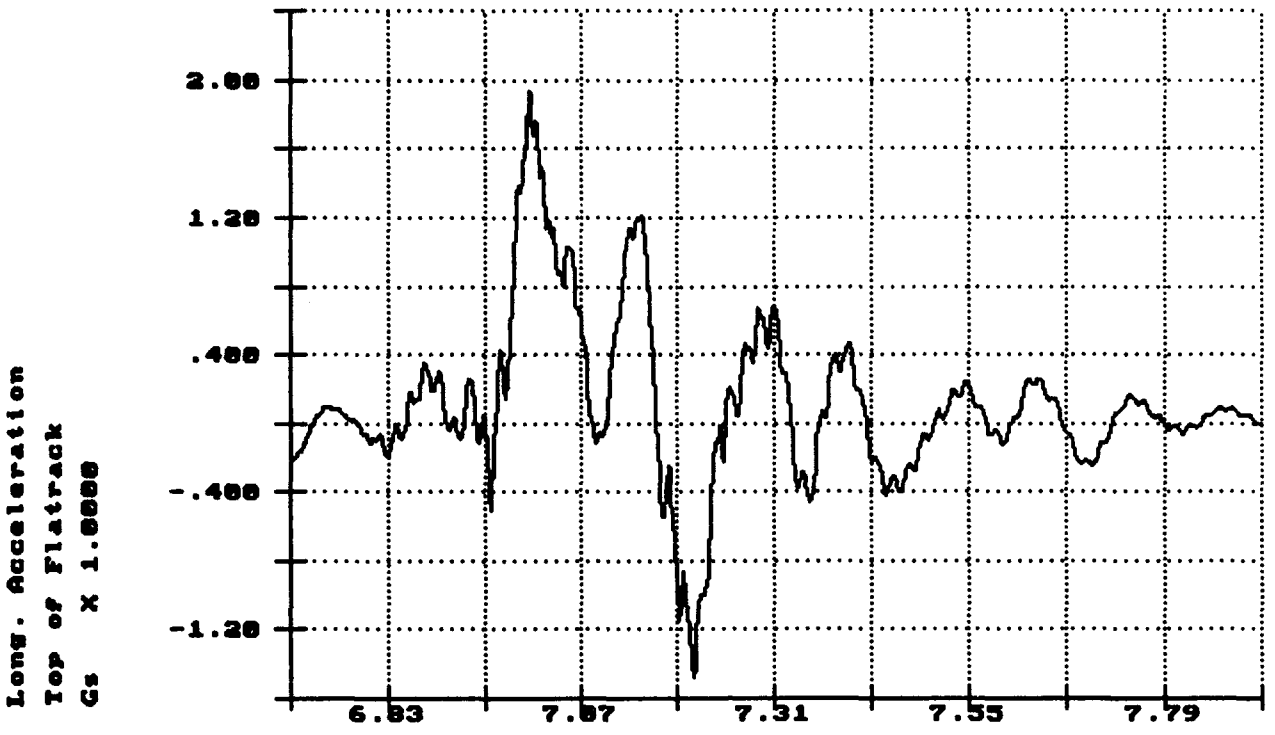
R.I. of PLS Flatracks, Impact 1: 4.72MPH Dec 06 14:44:45 1993



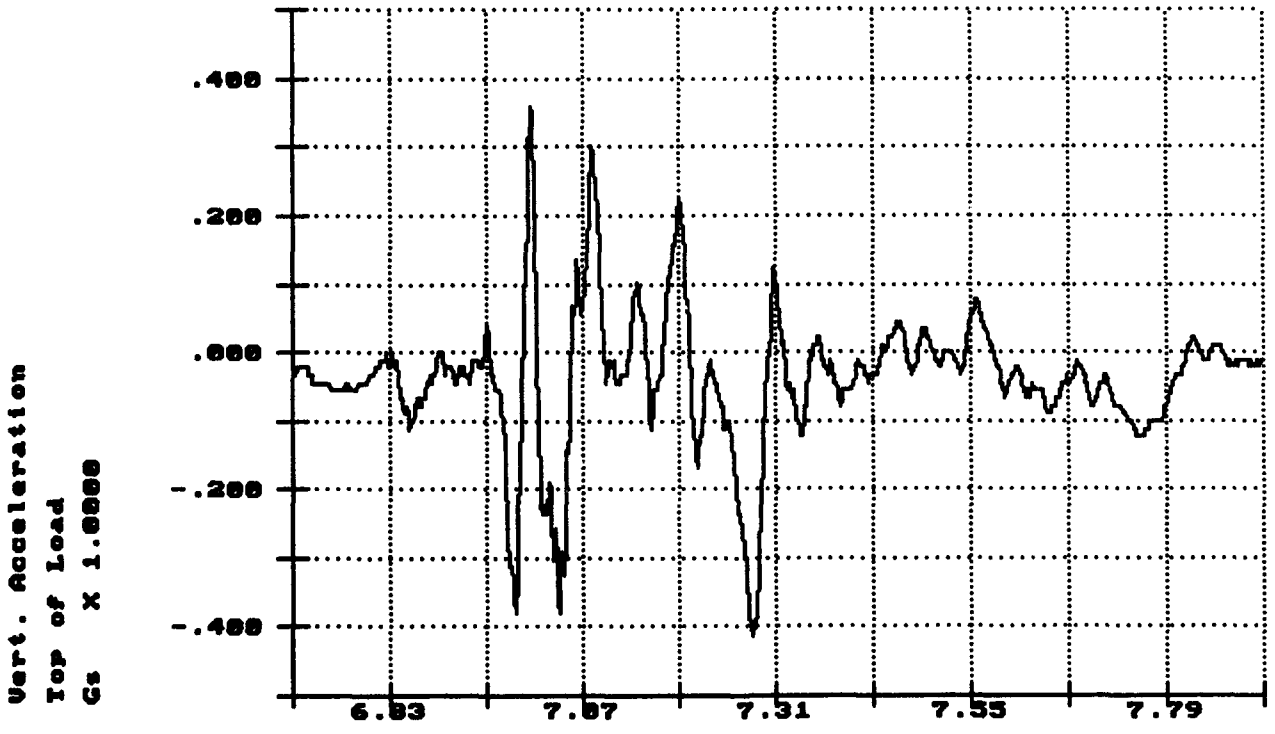
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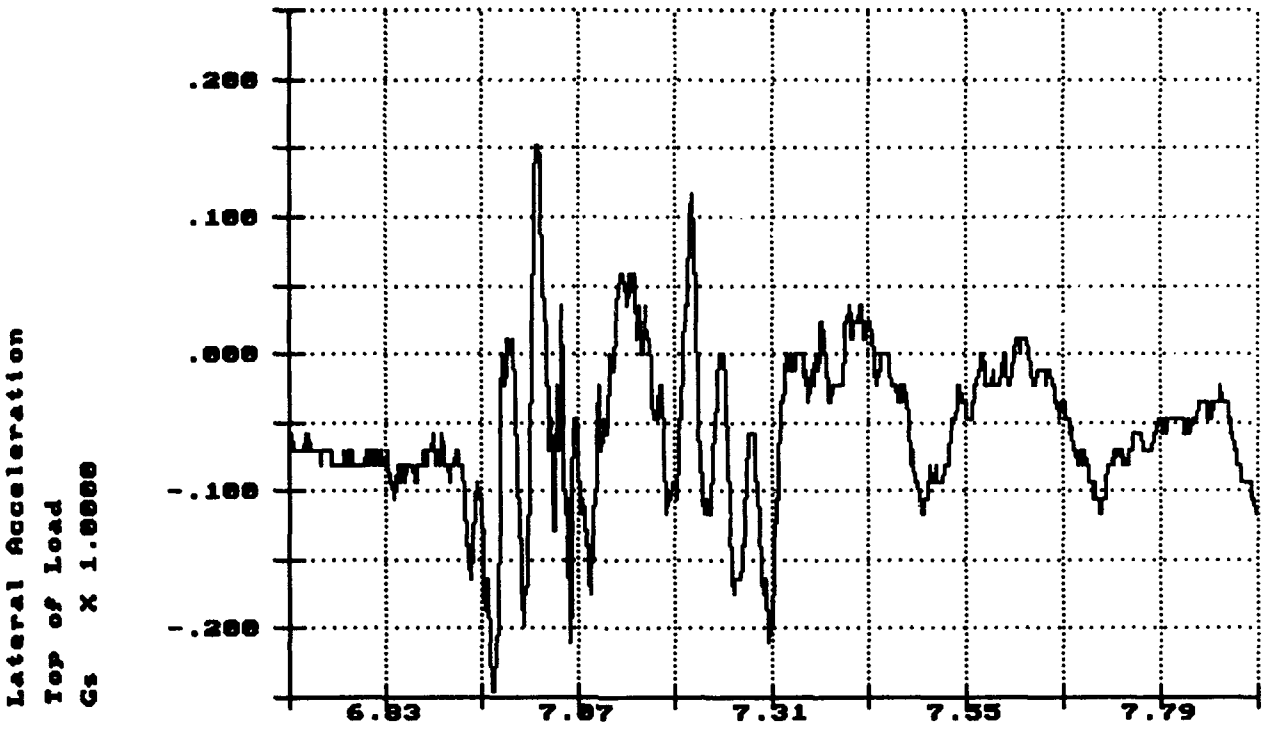
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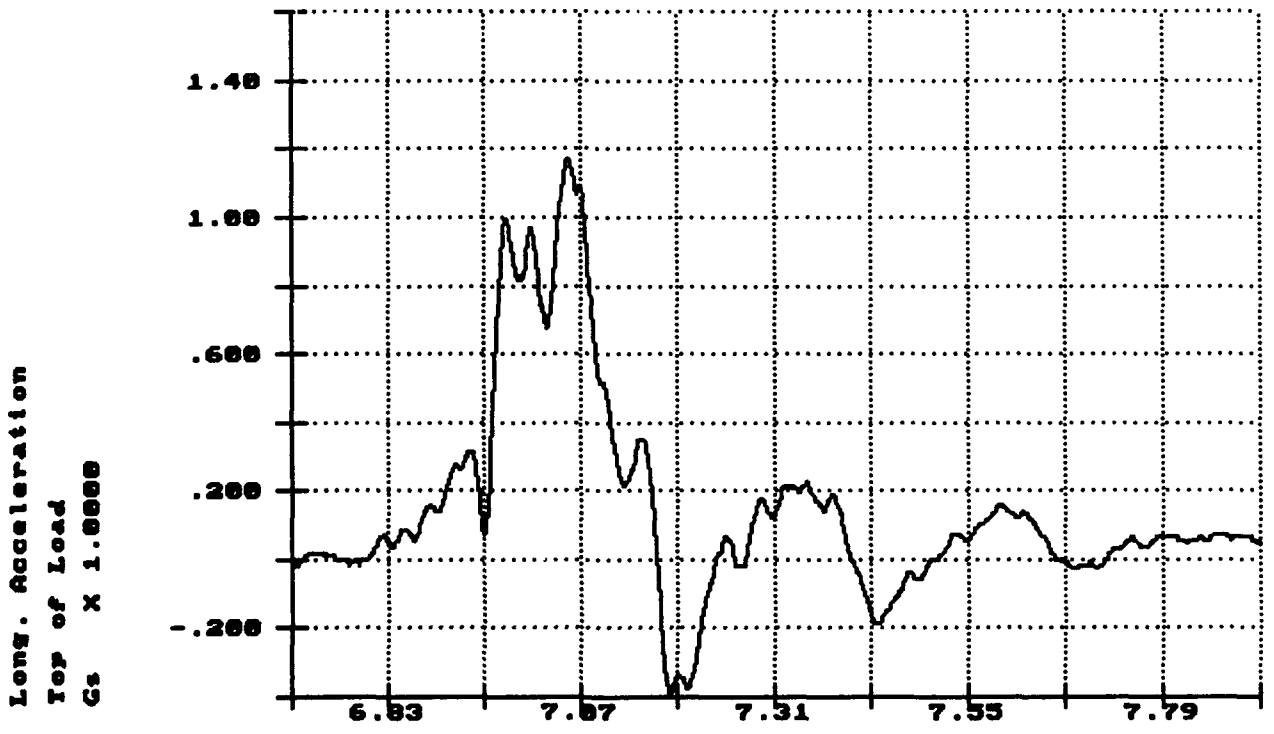
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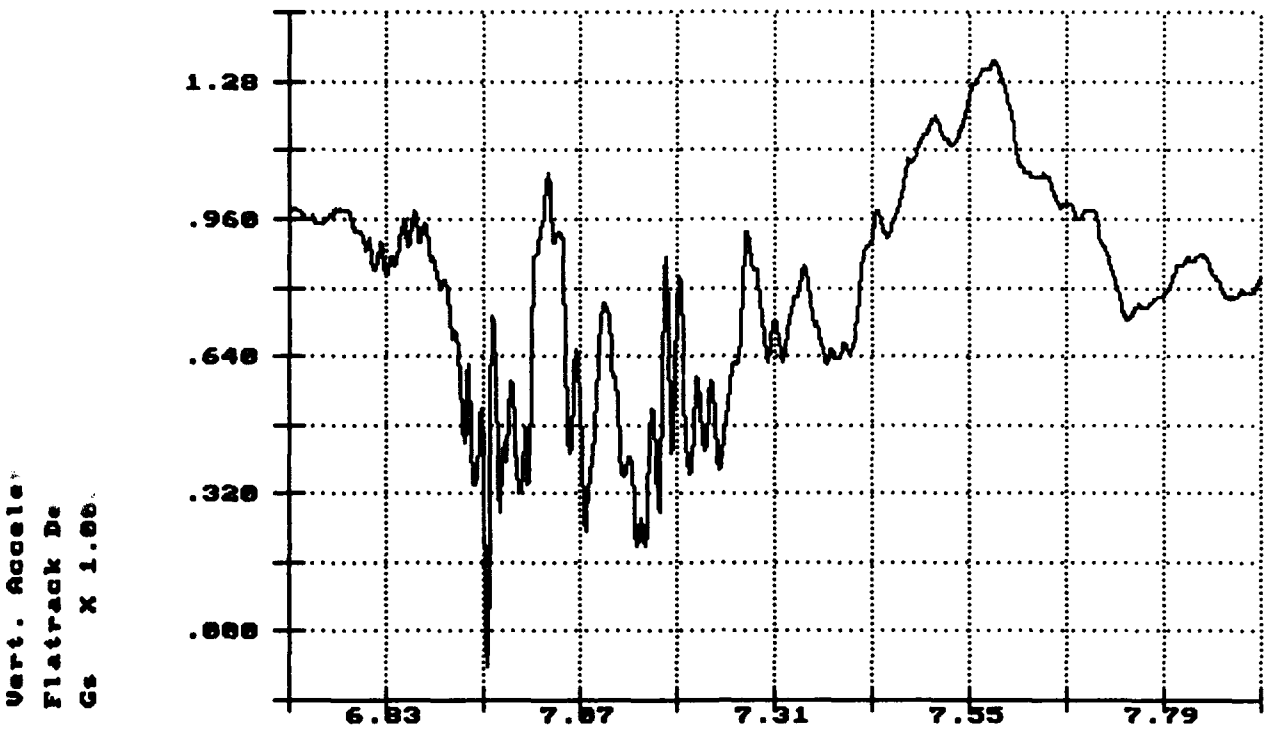
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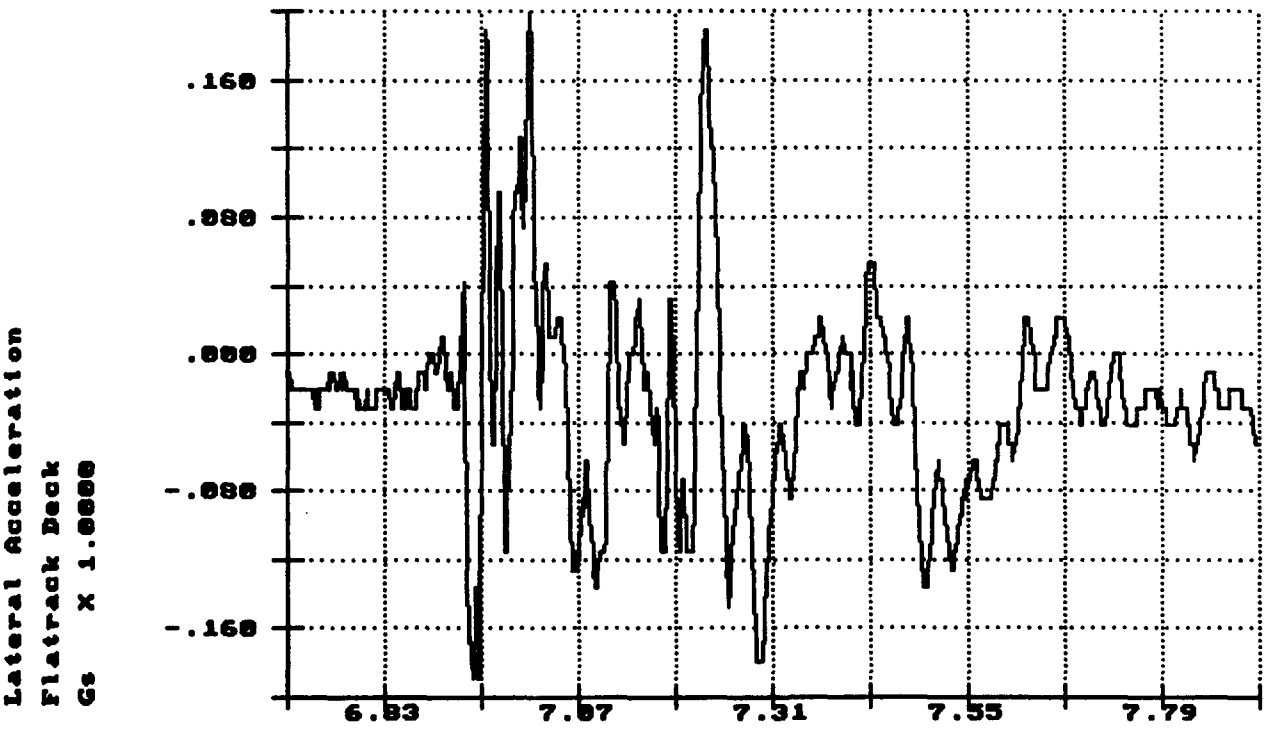
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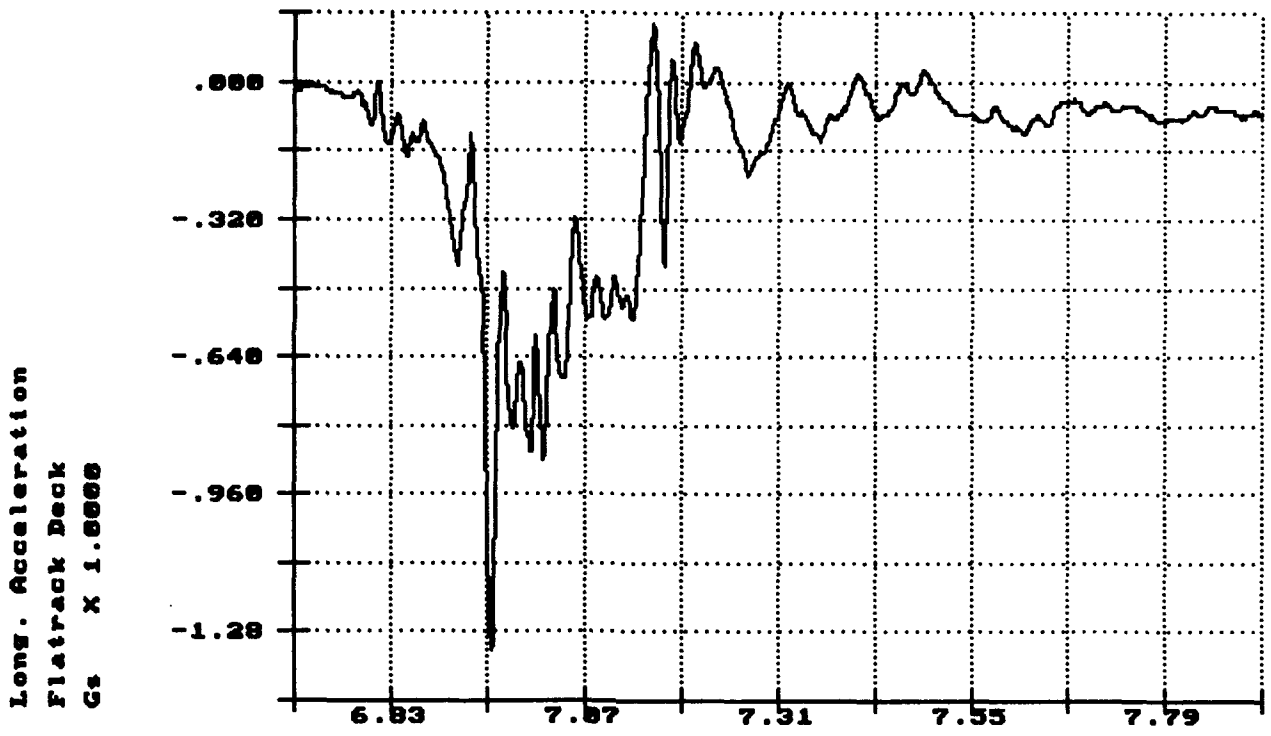
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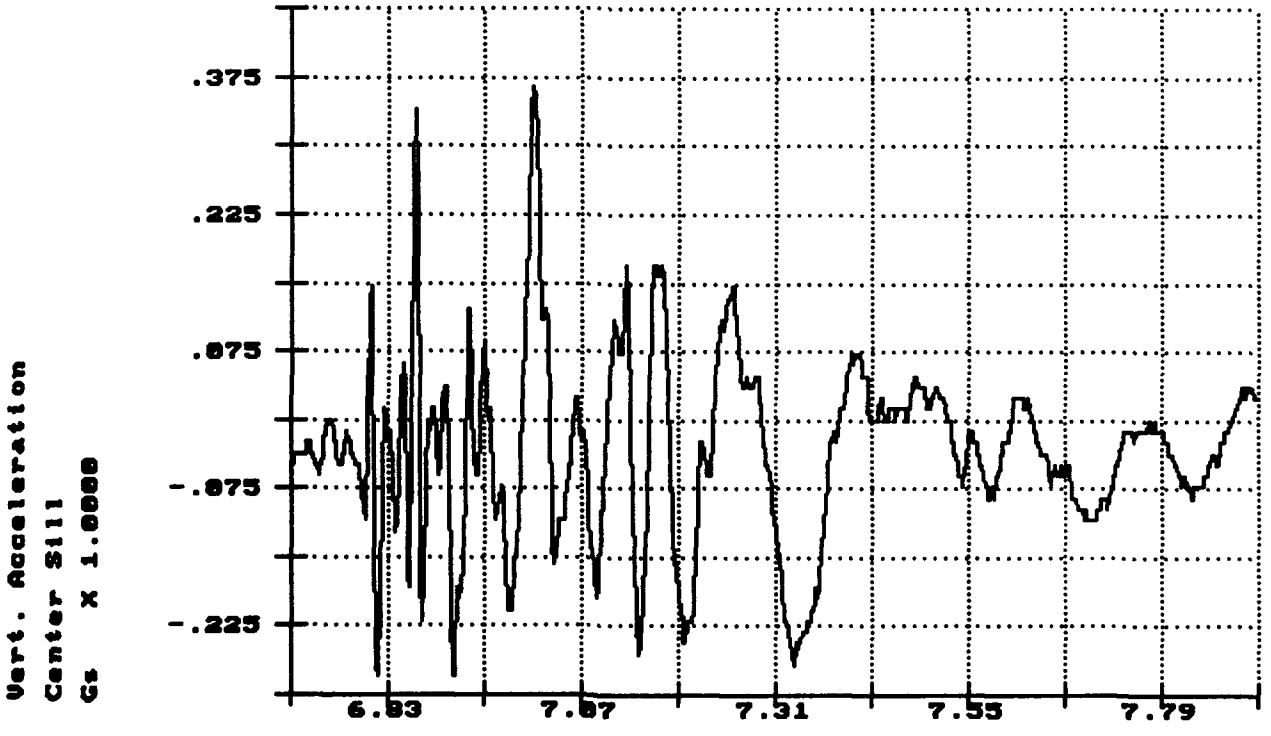
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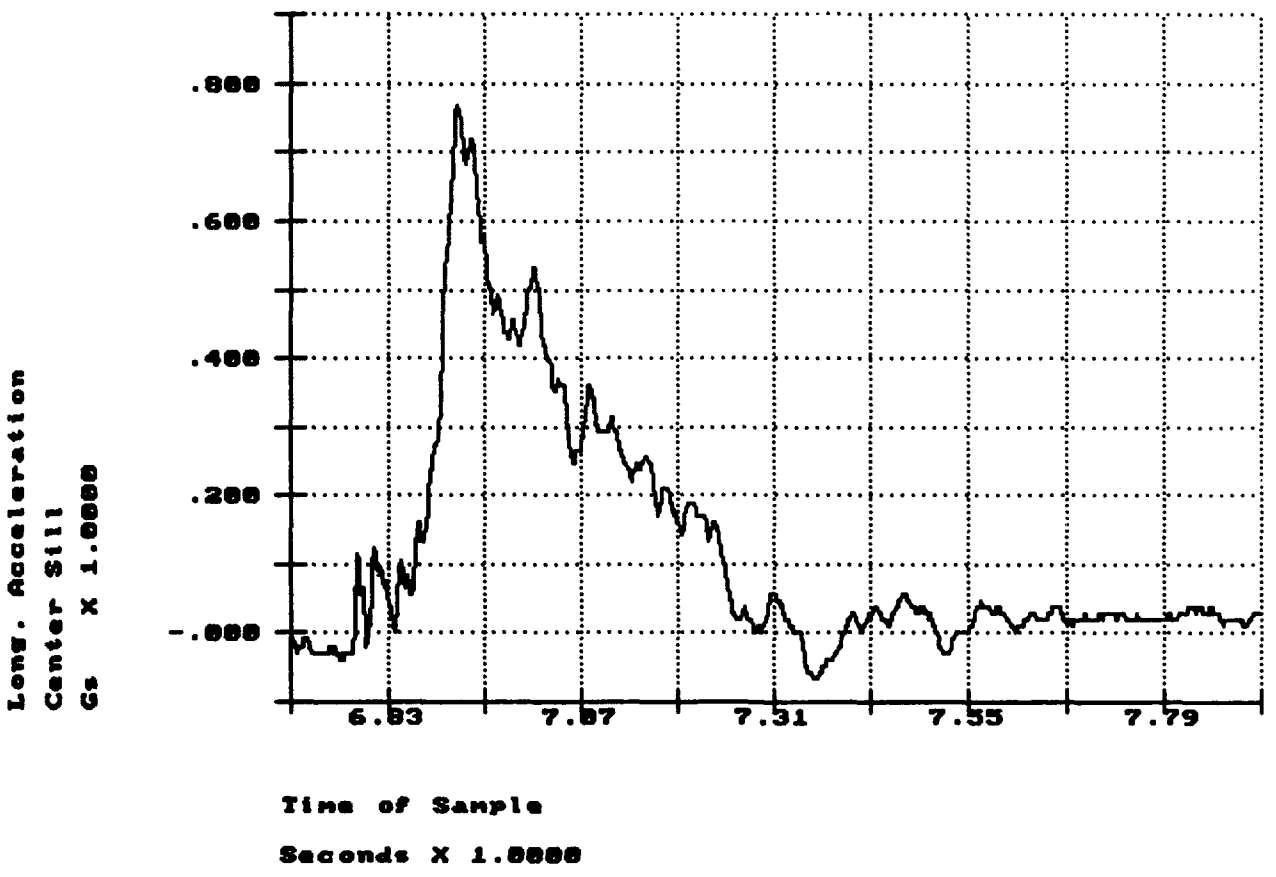
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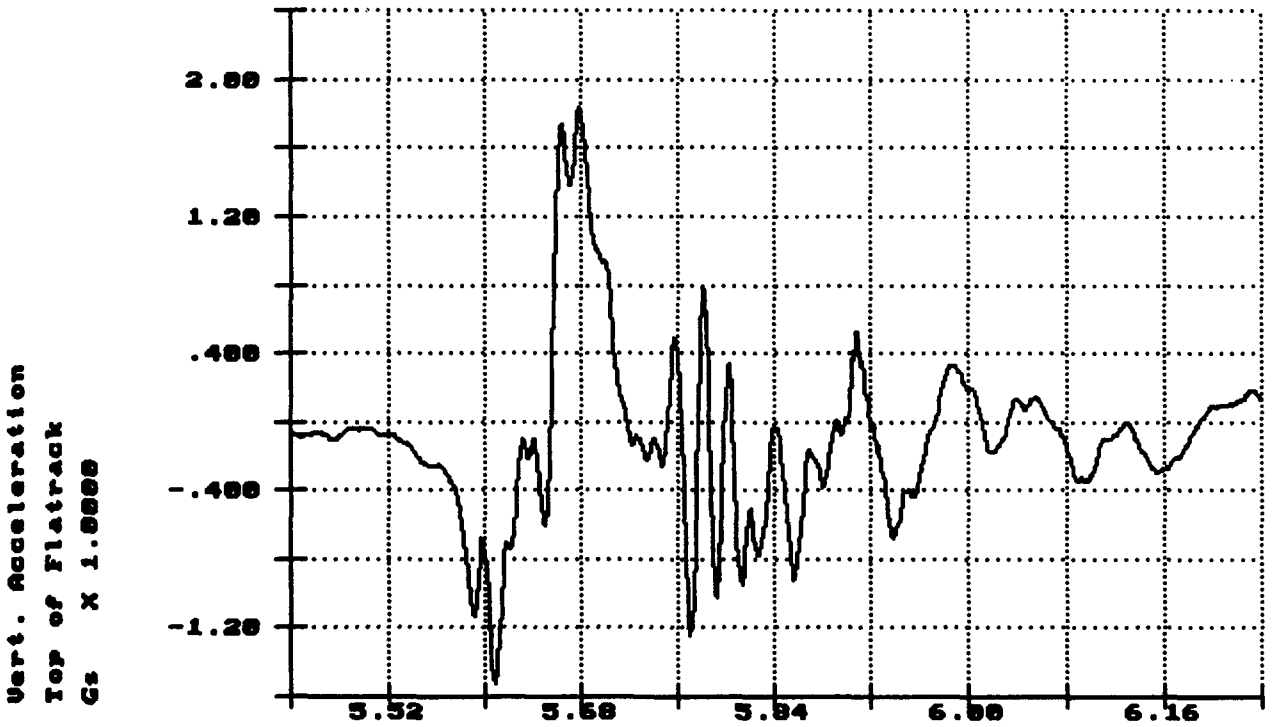
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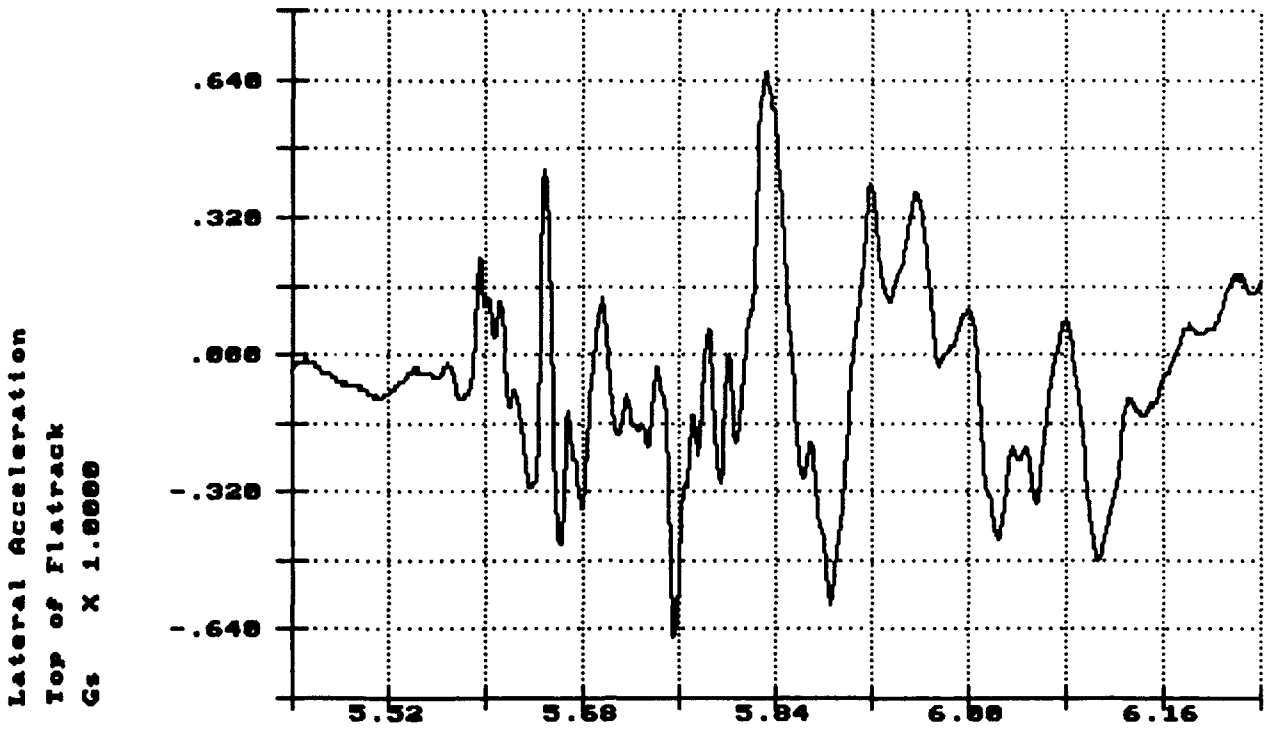
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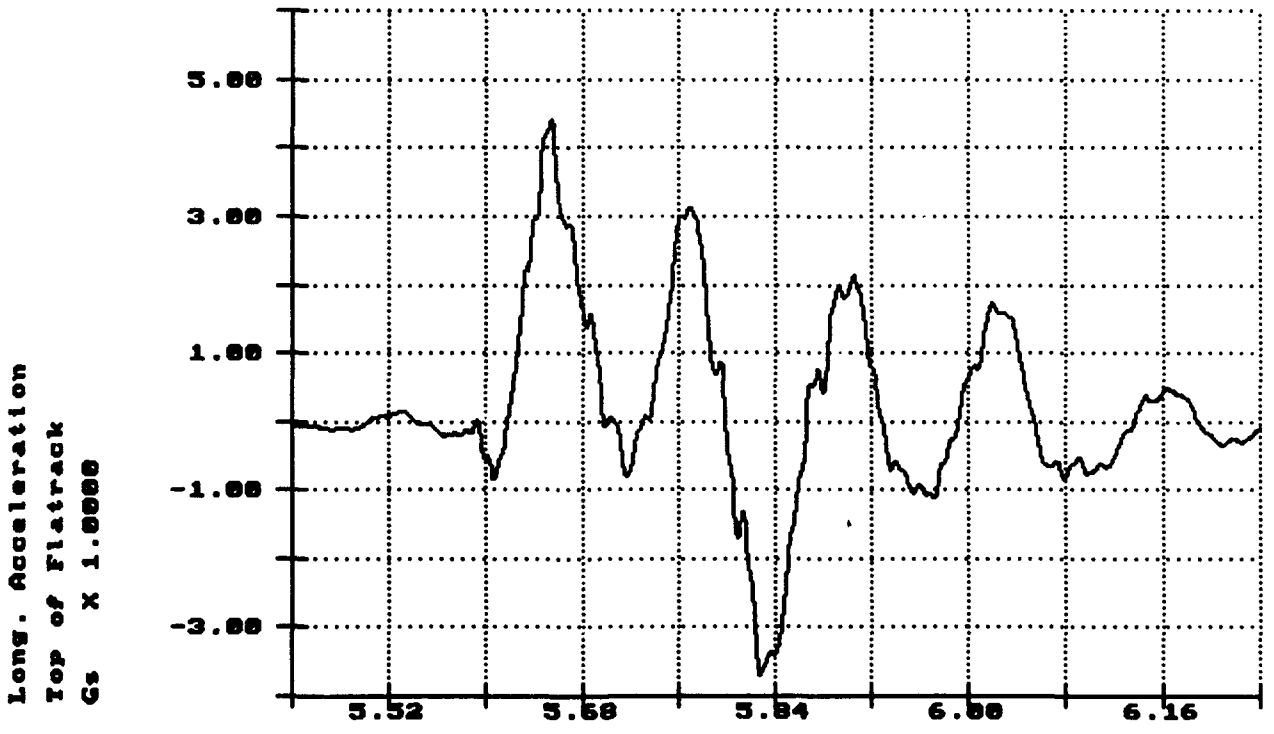
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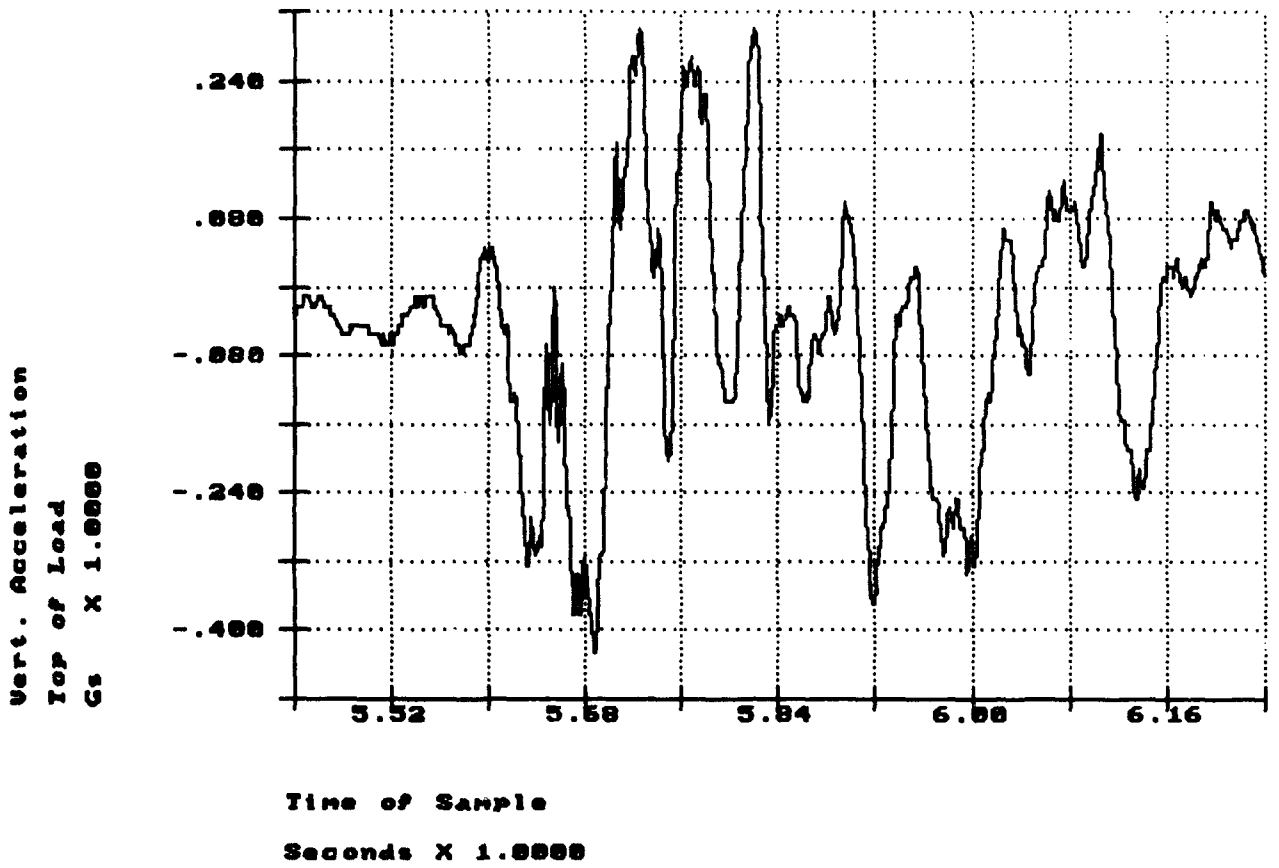
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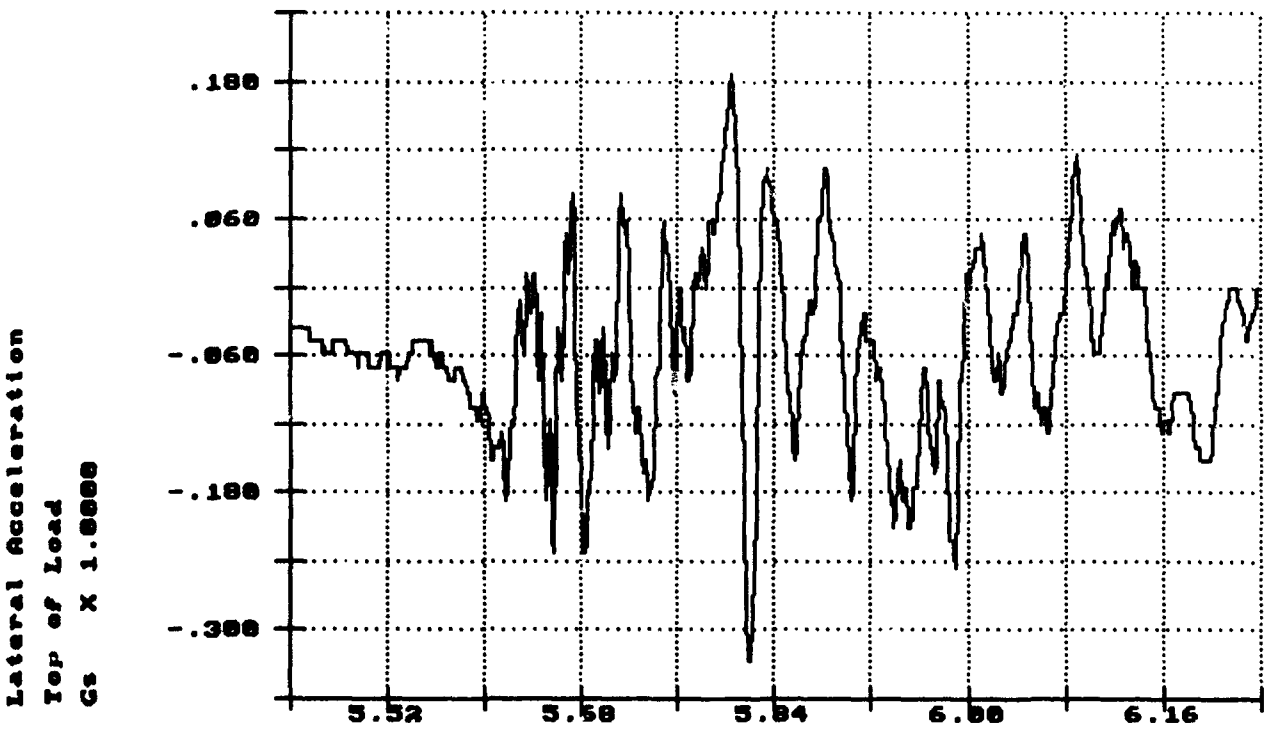
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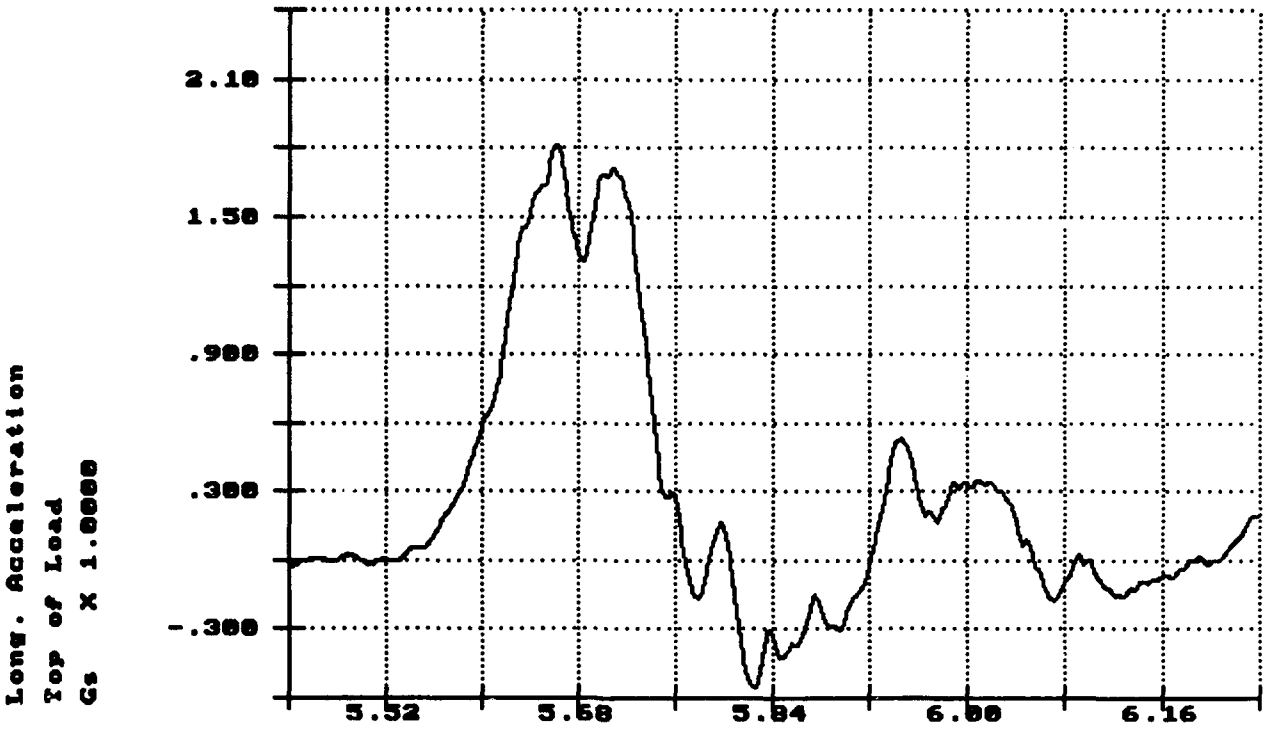
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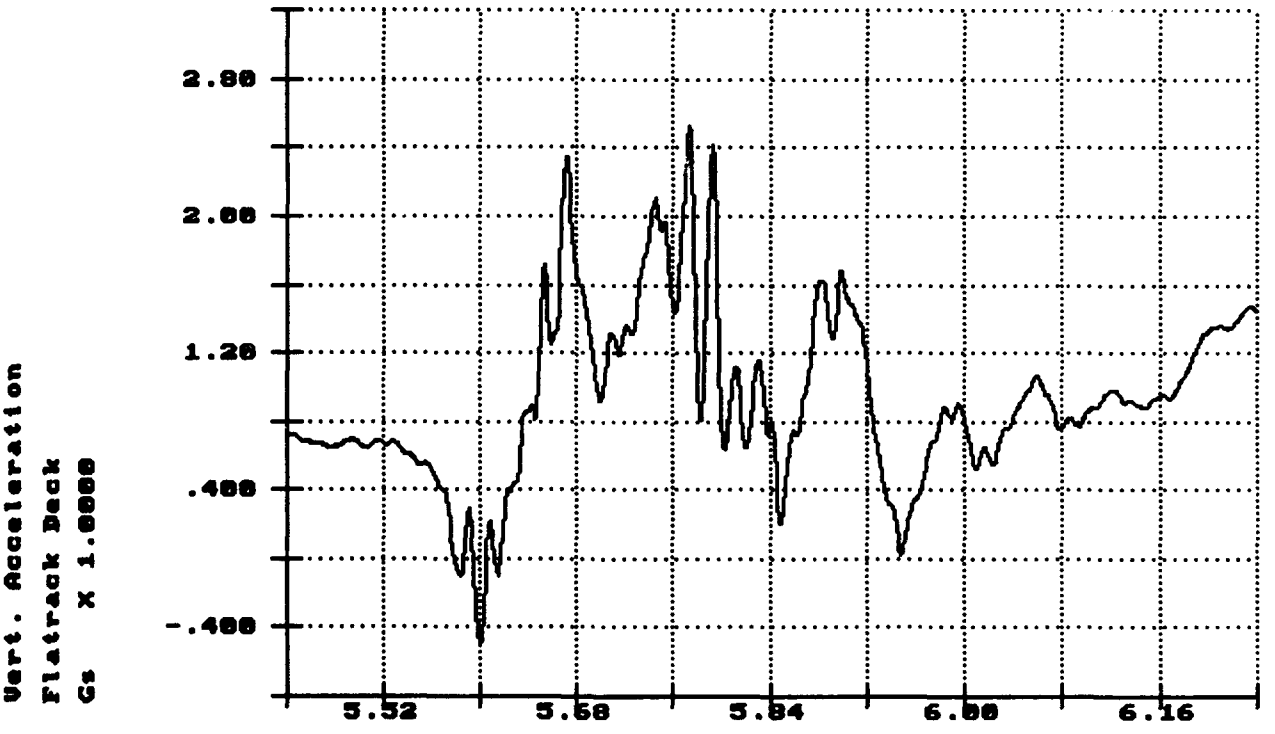
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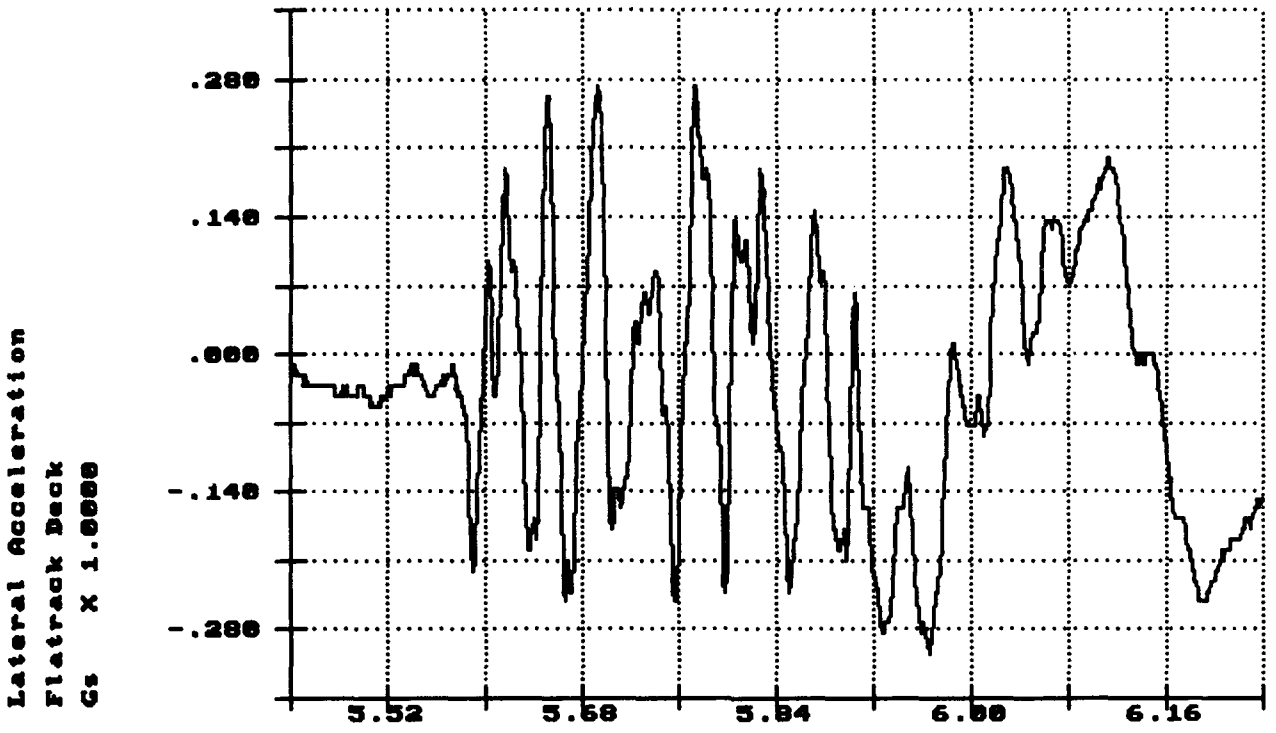
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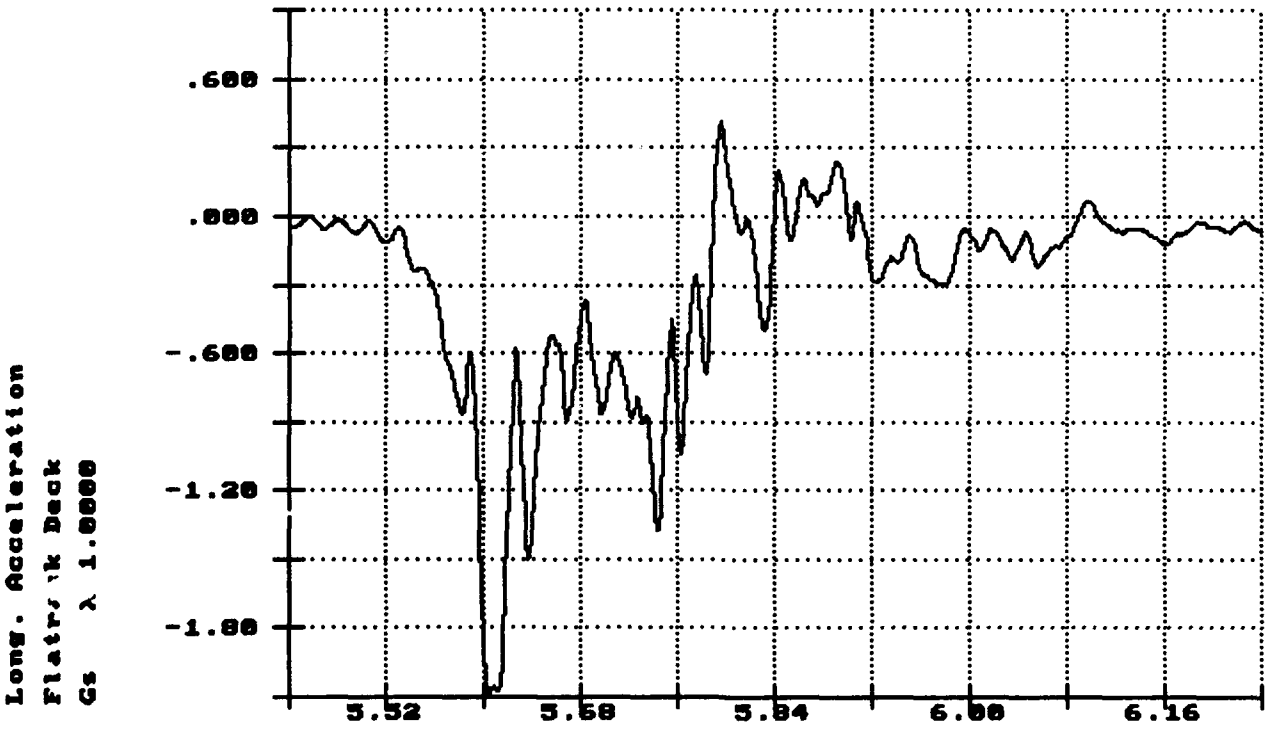
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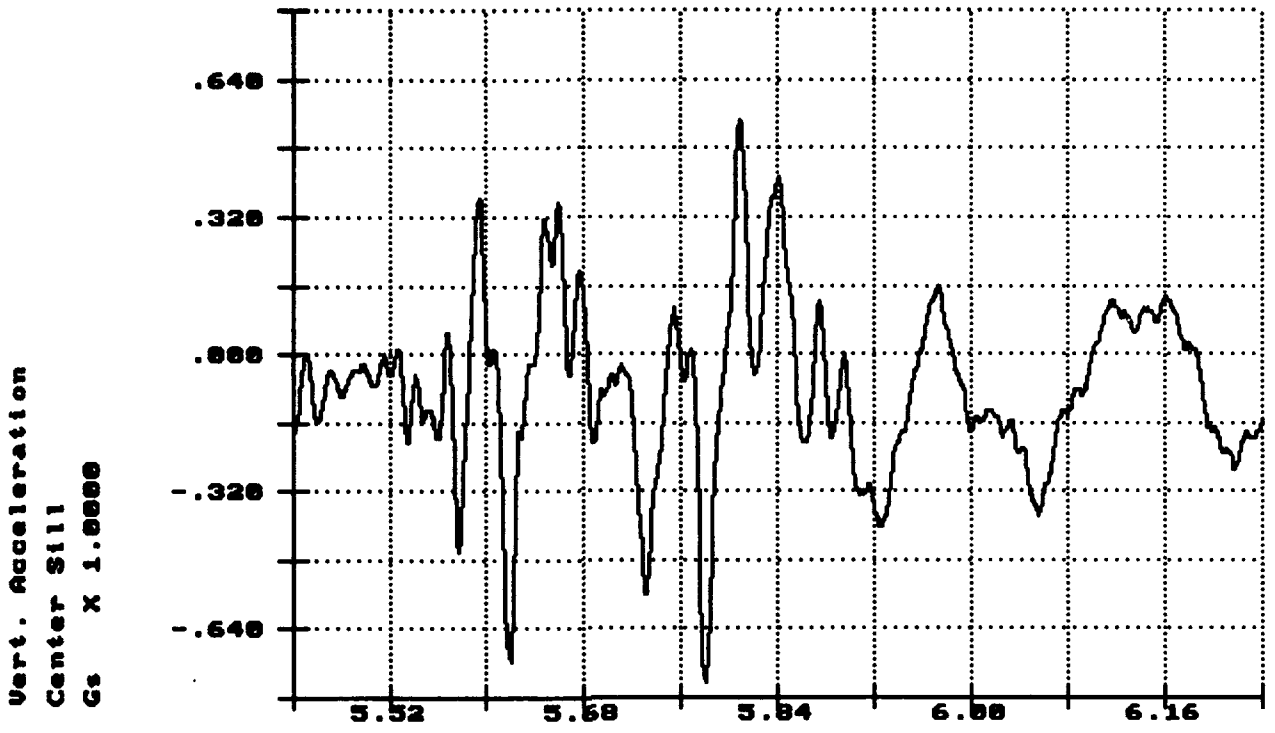
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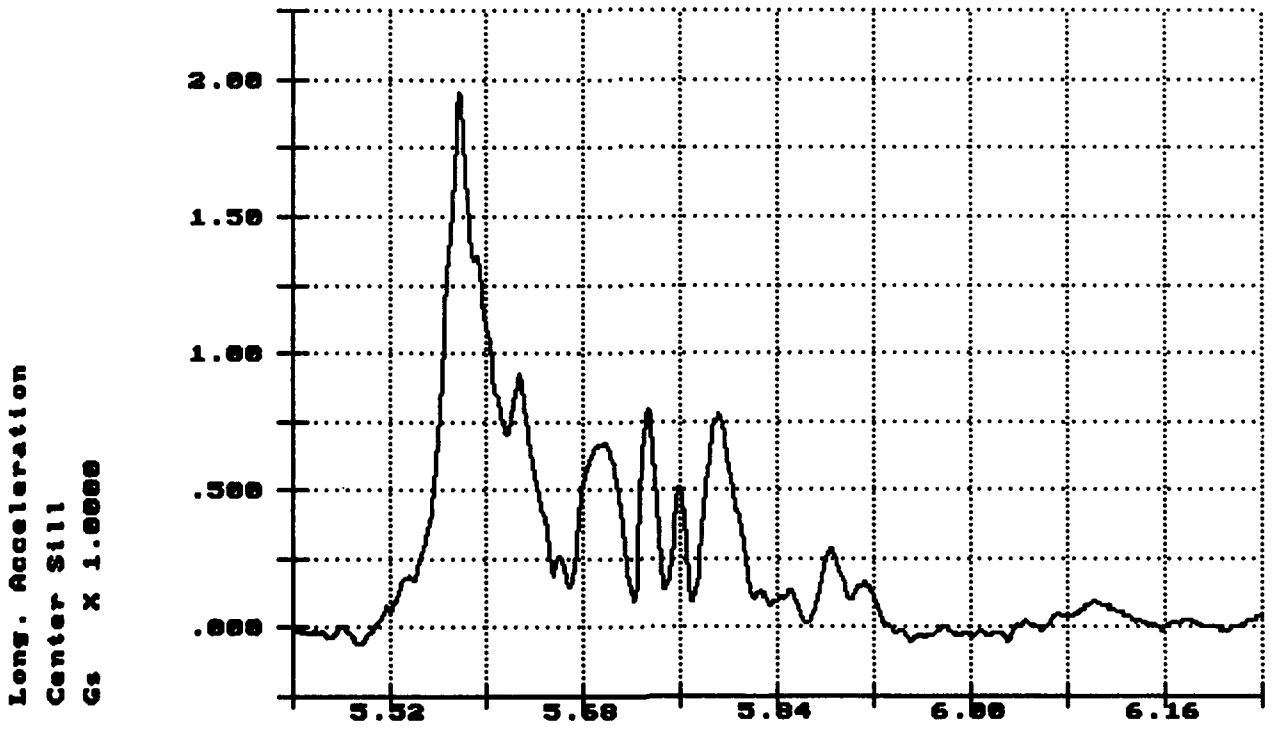
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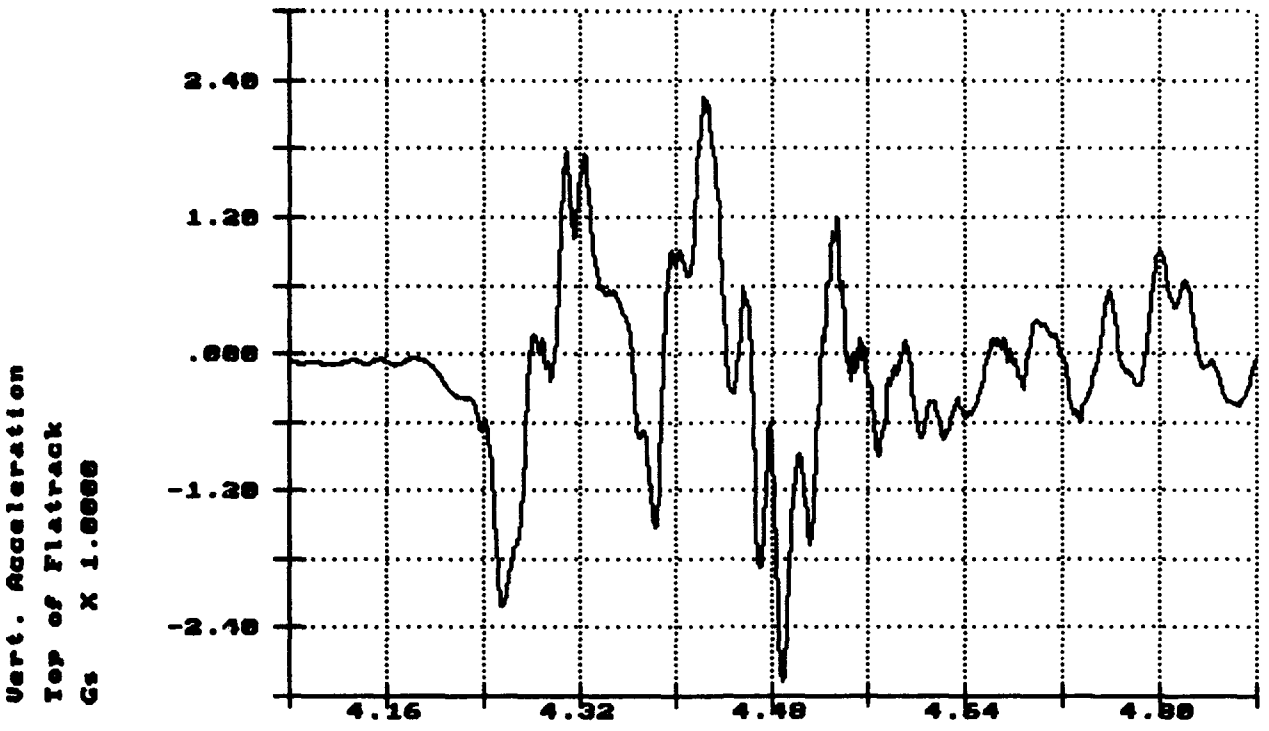
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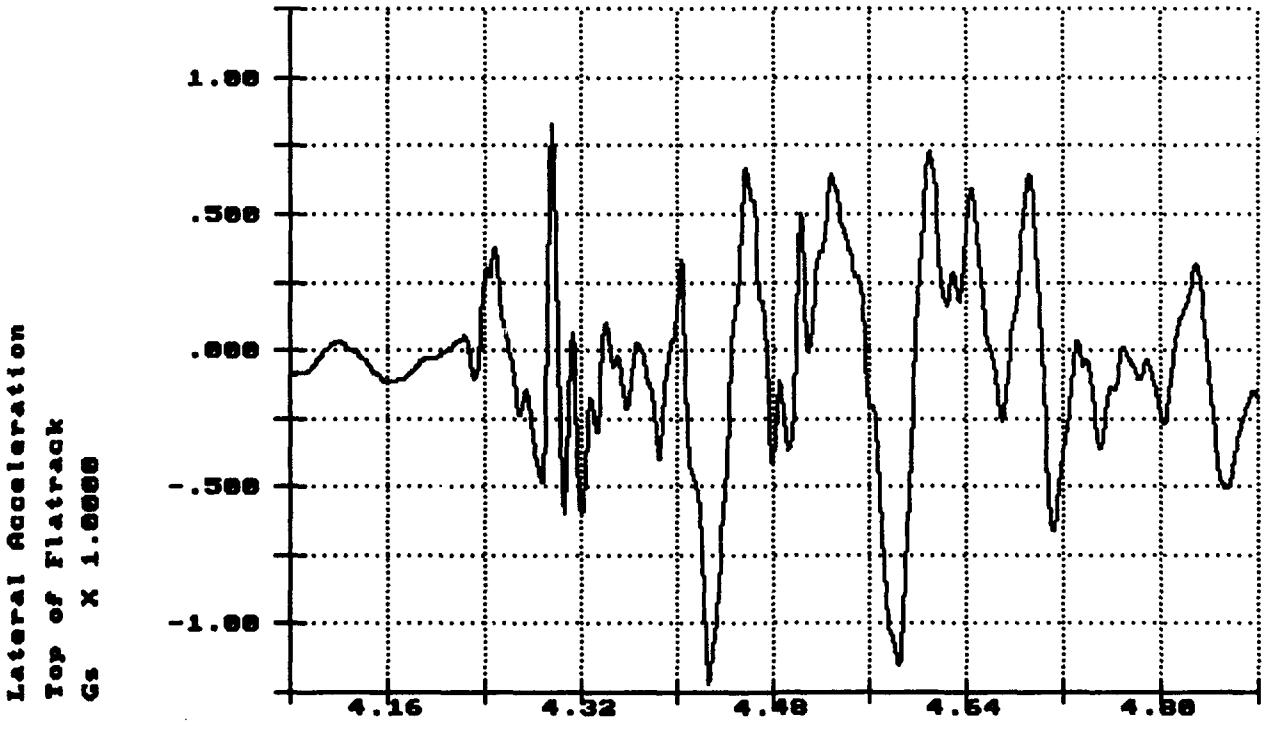
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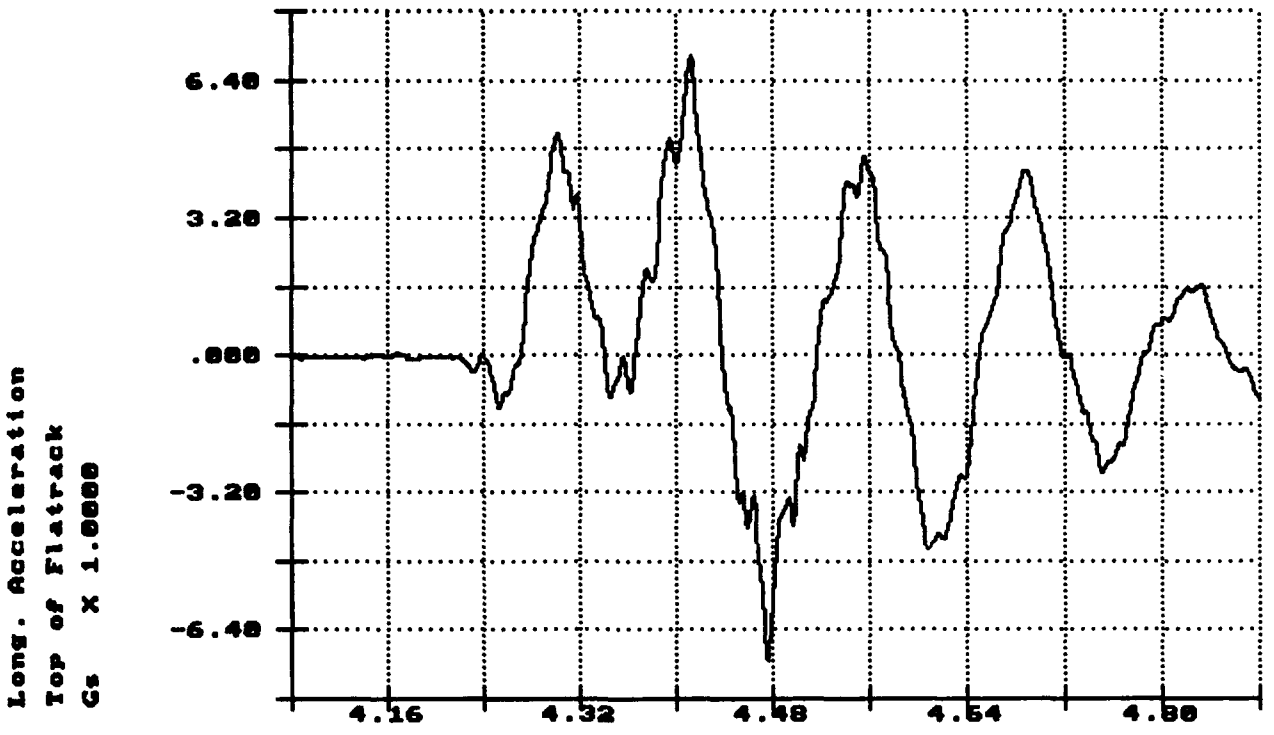
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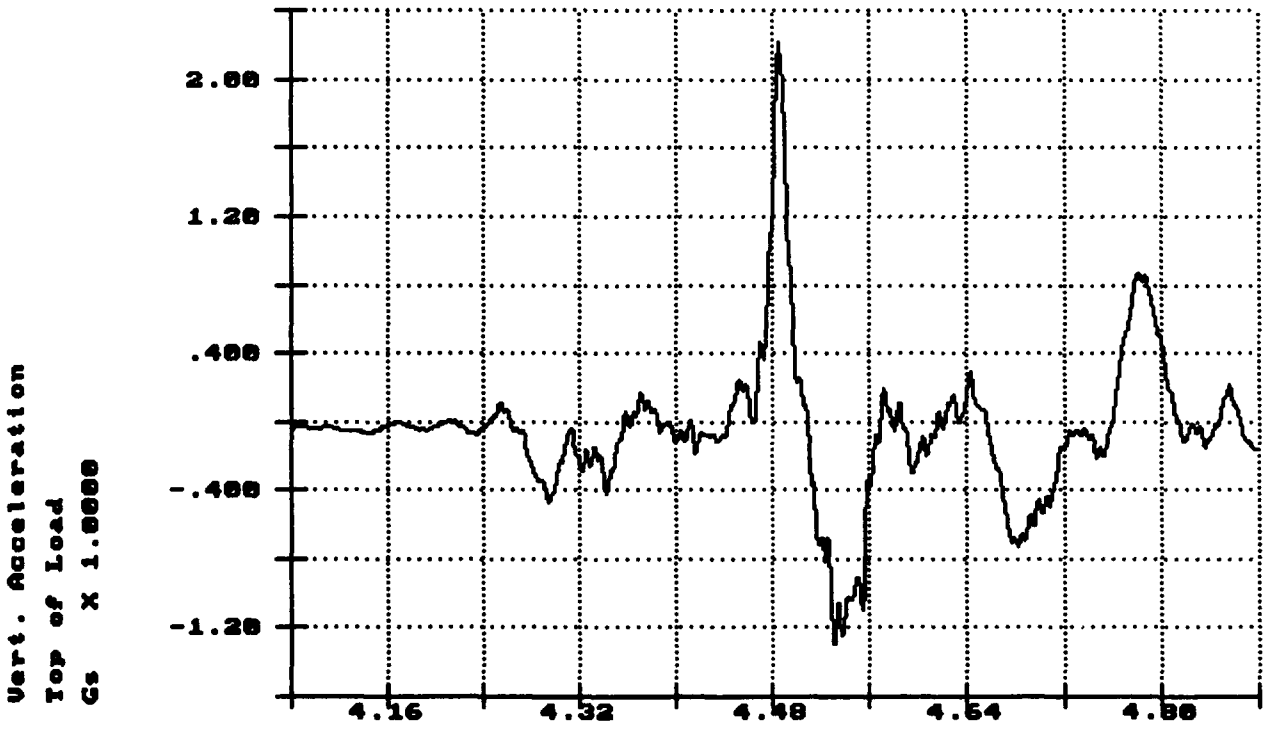
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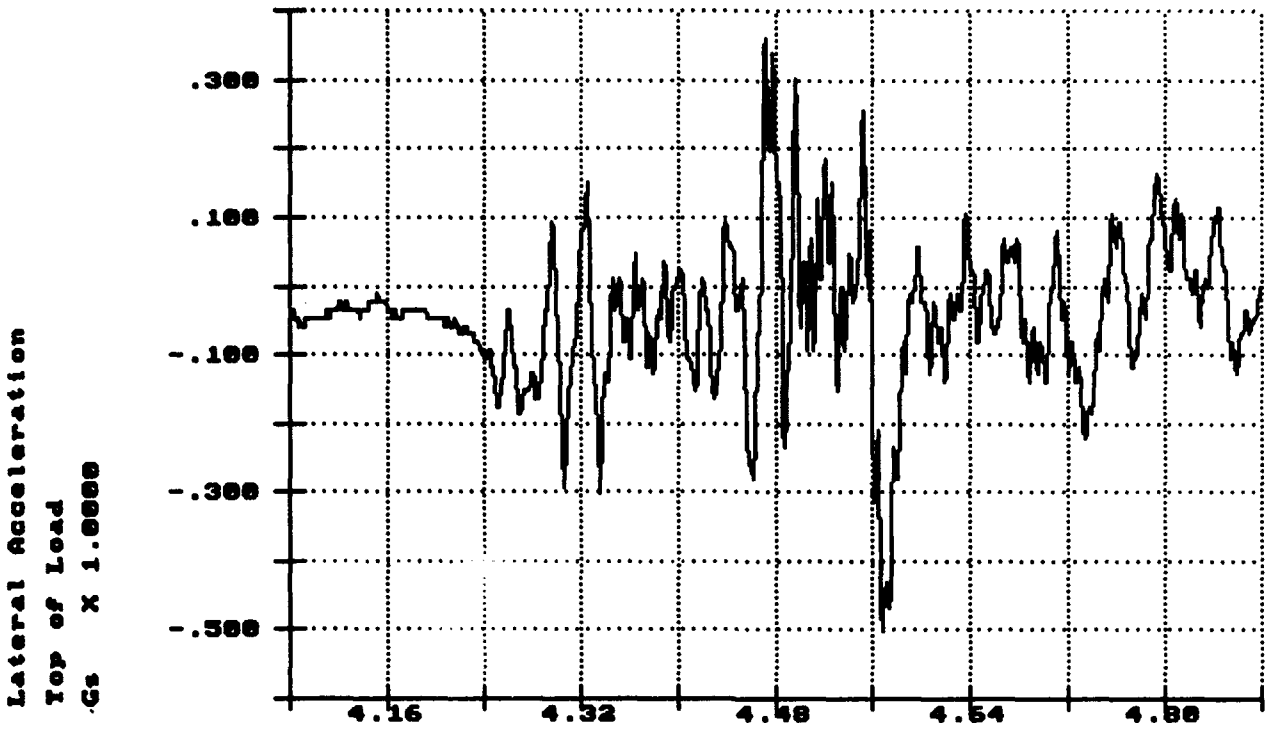
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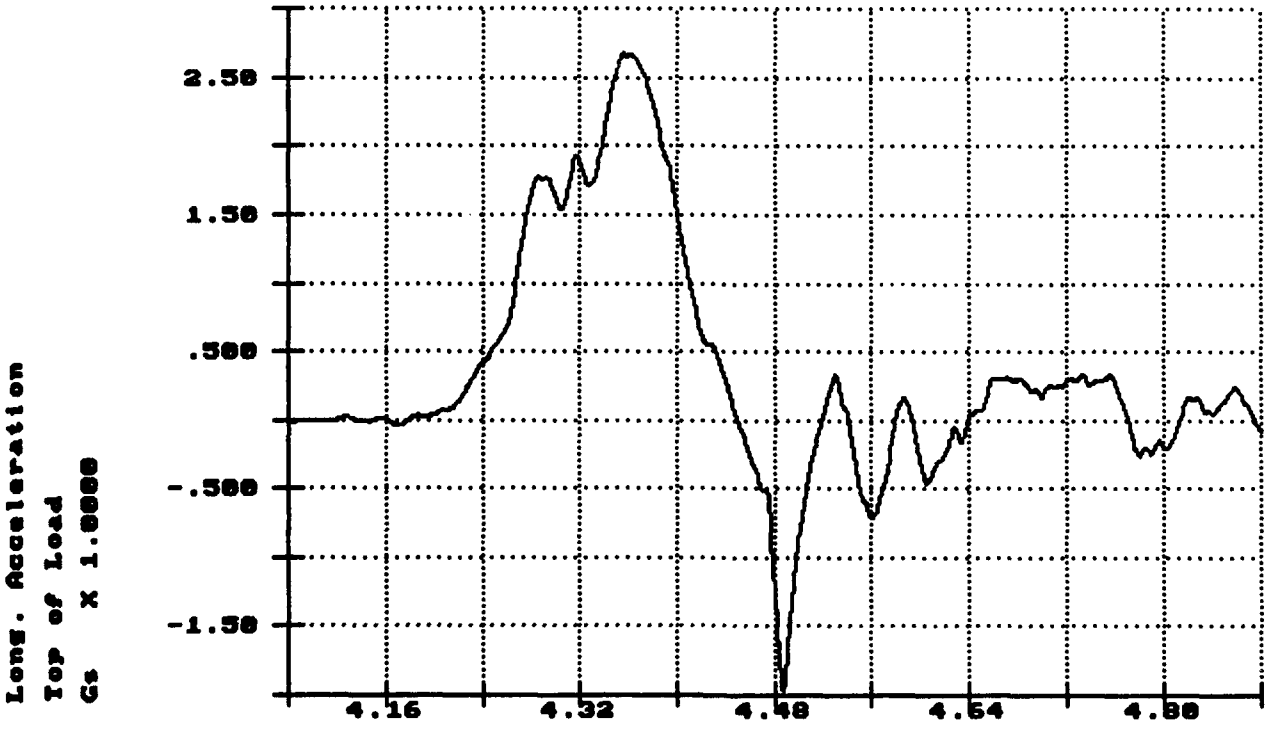
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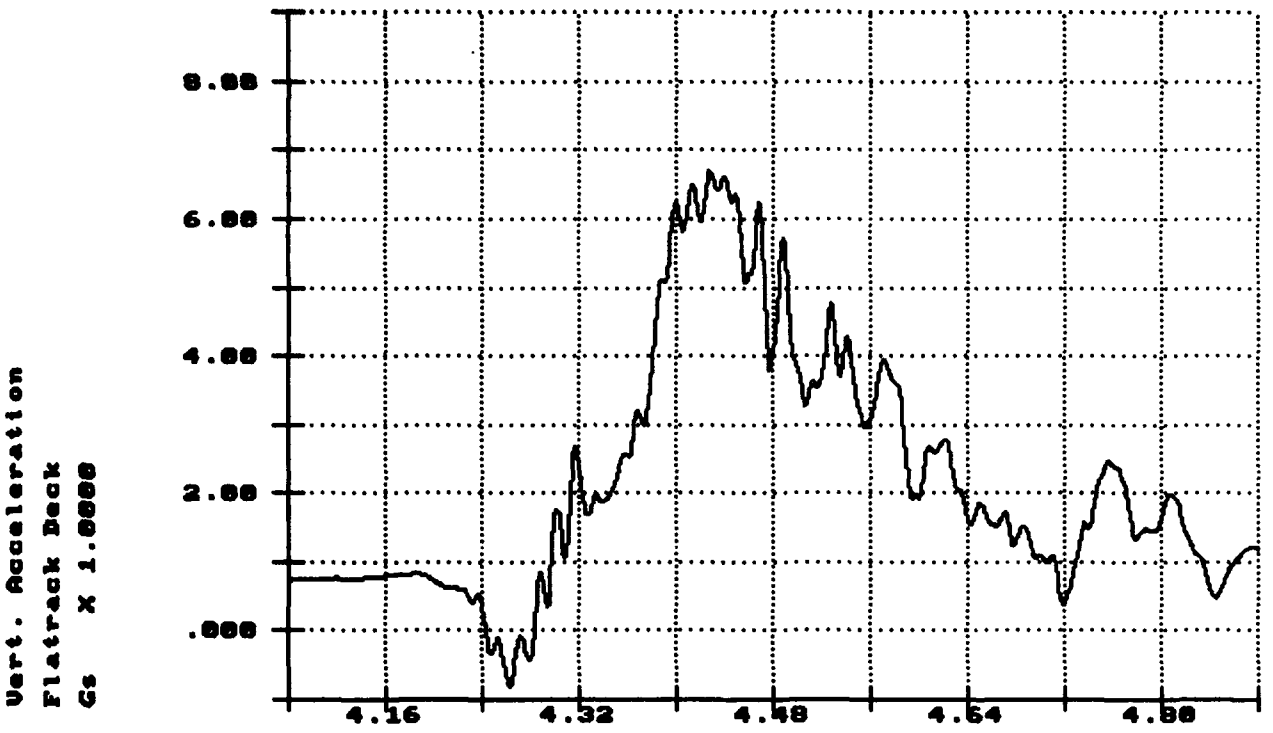
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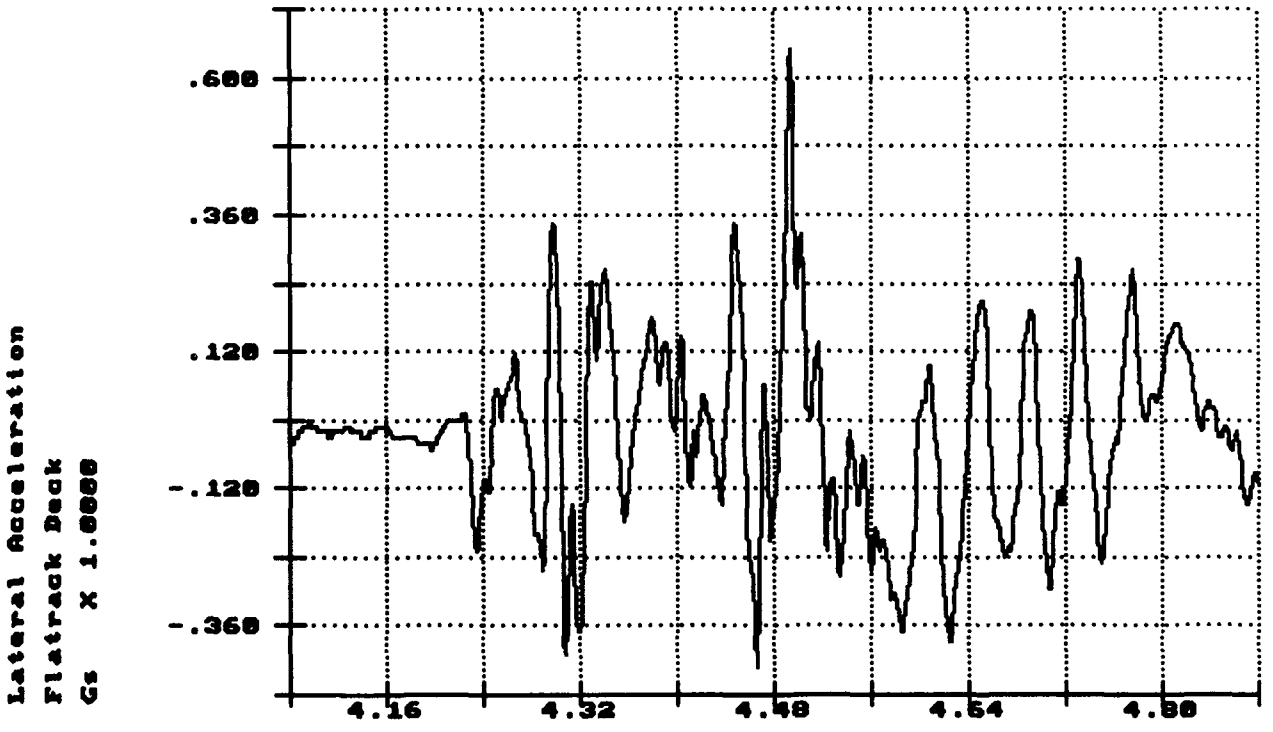
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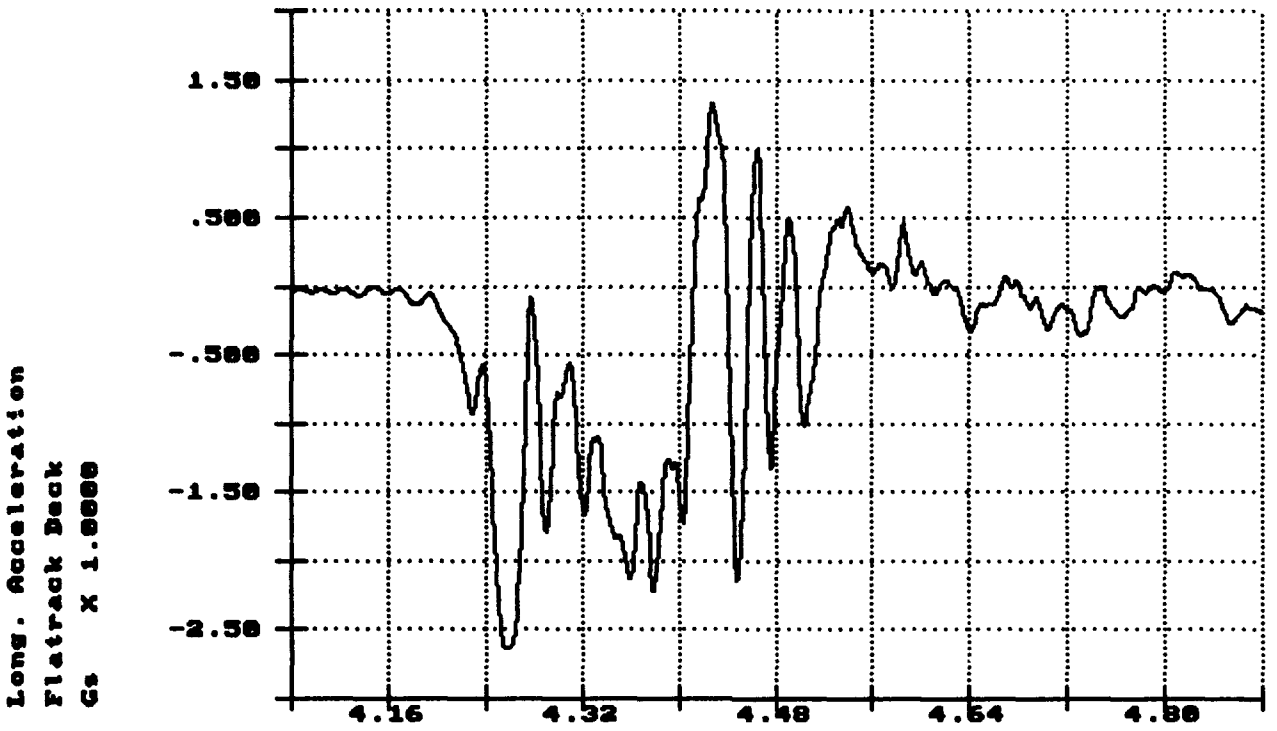
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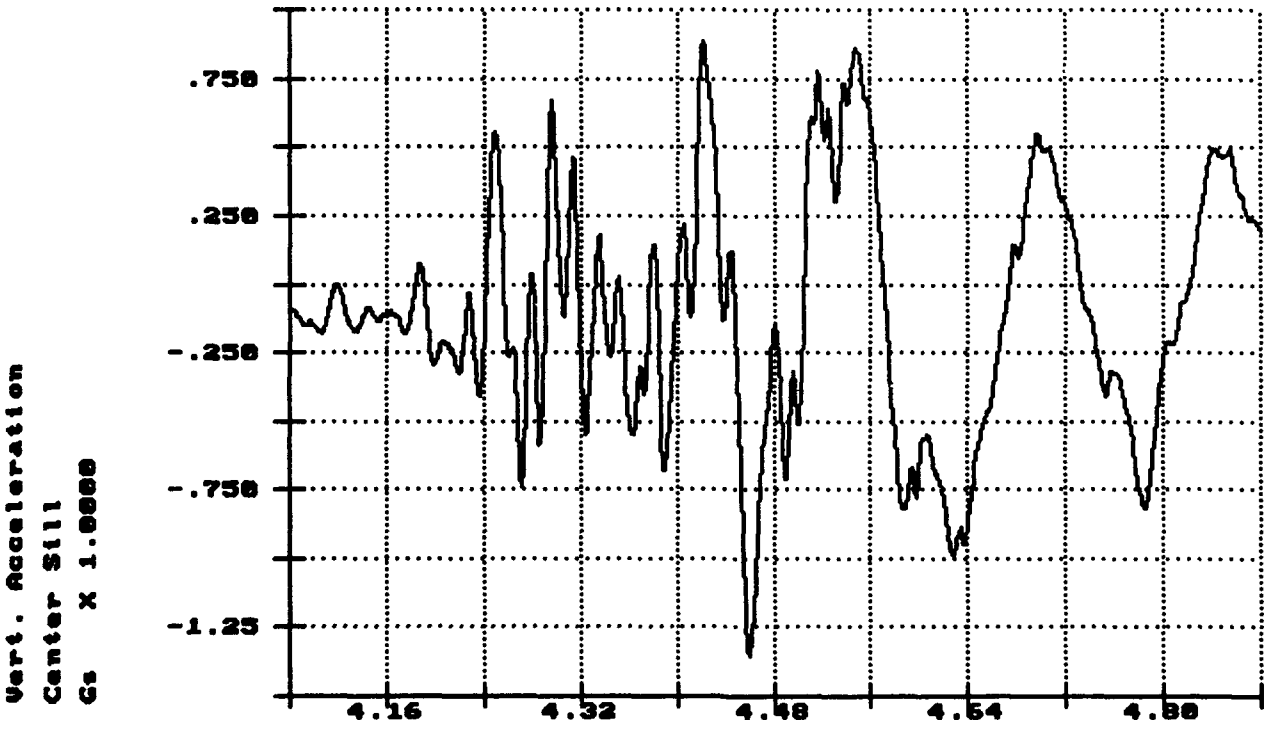
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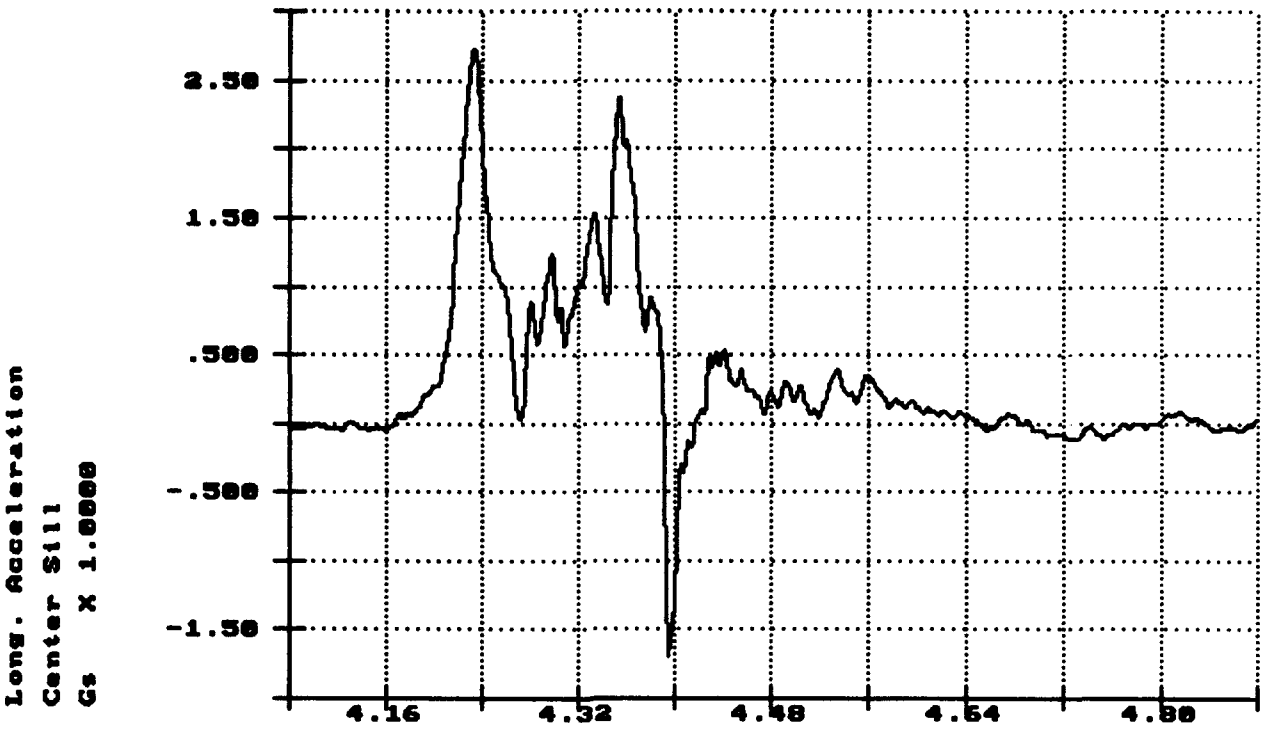
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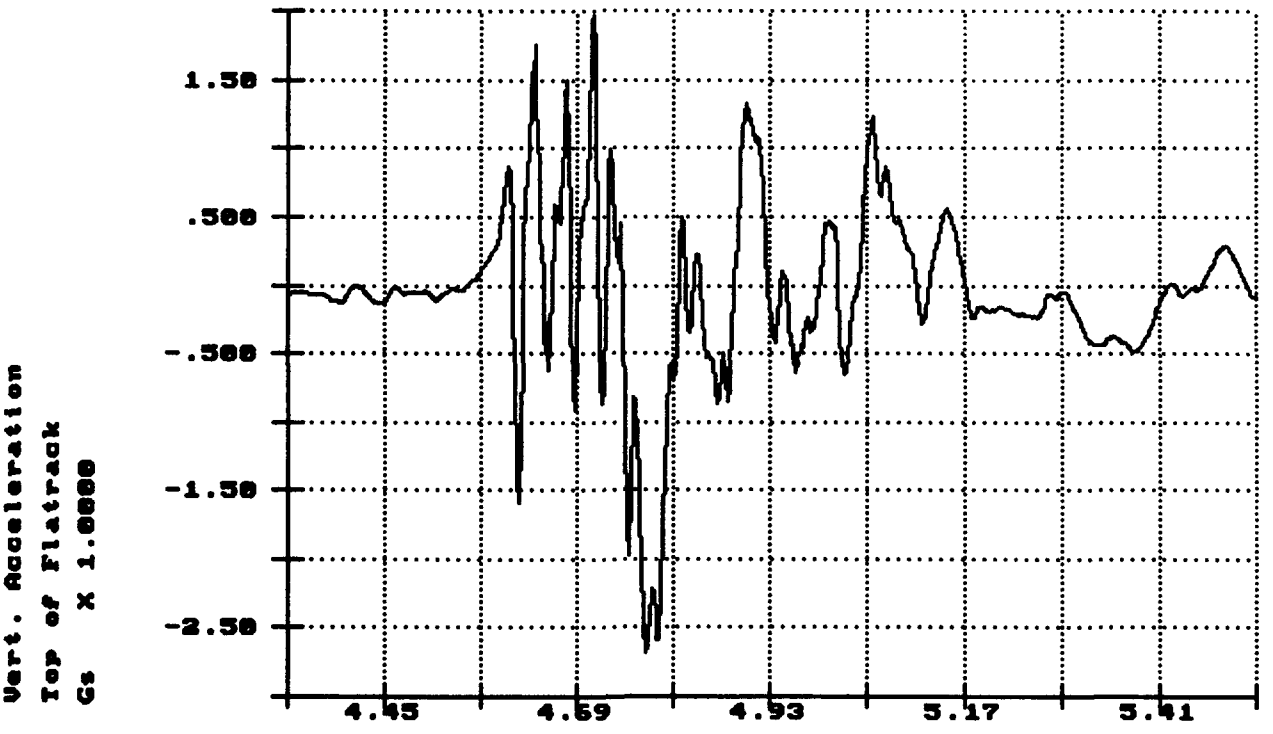
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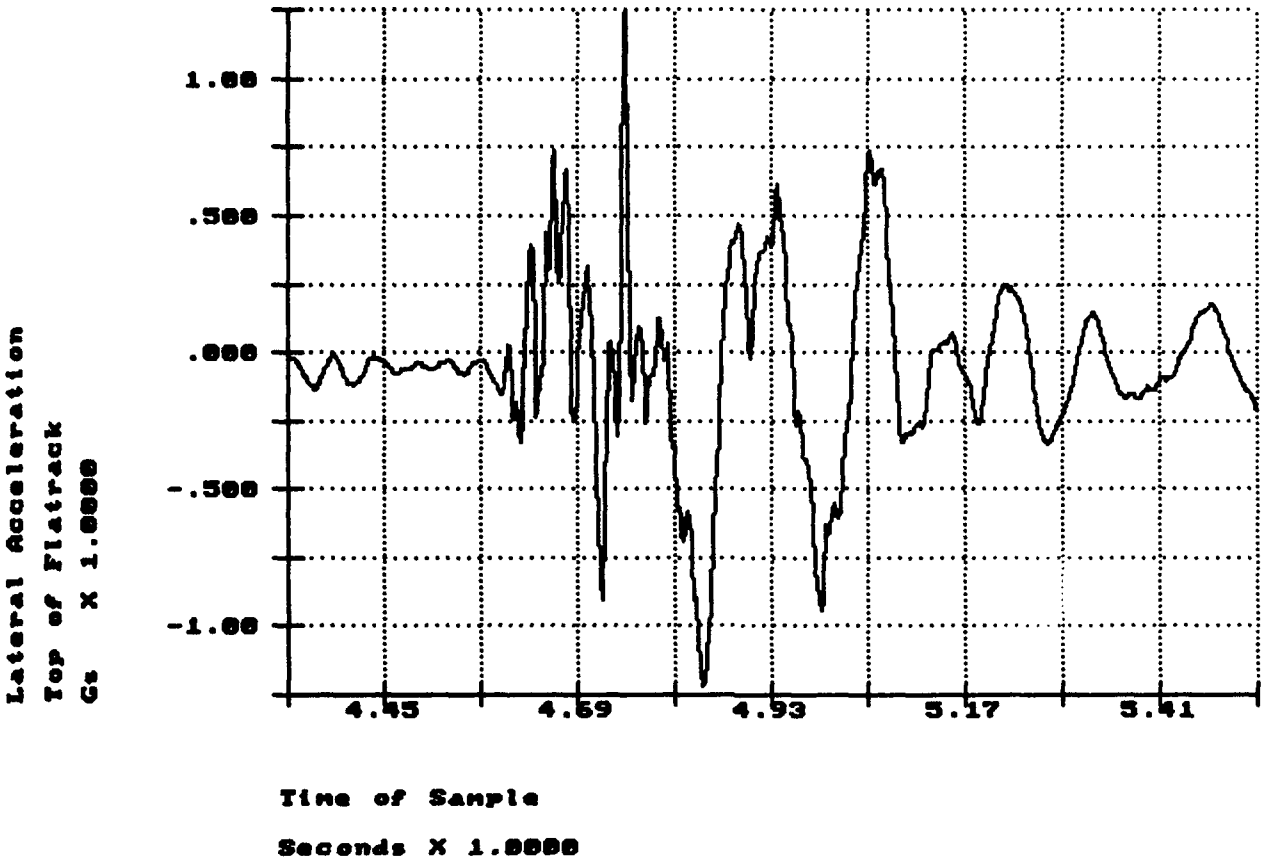
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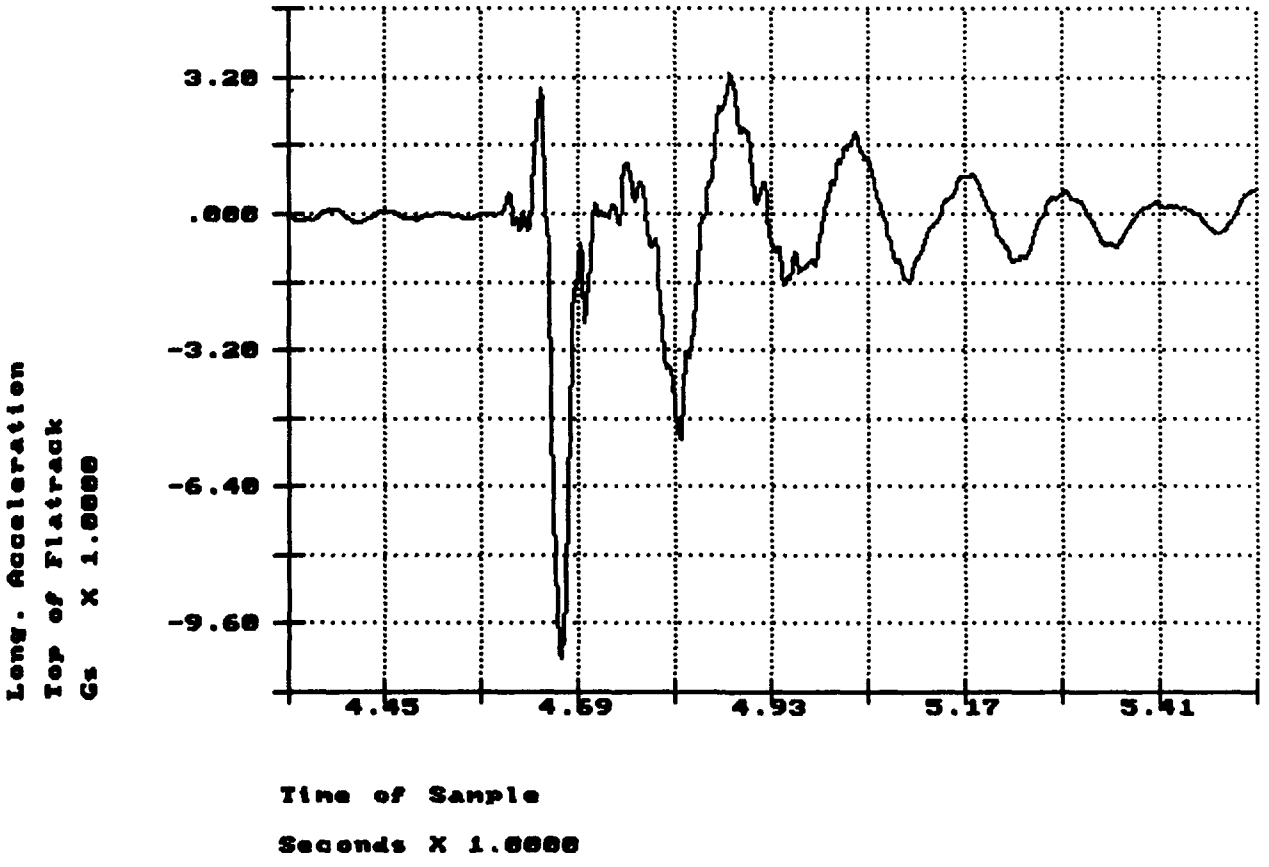
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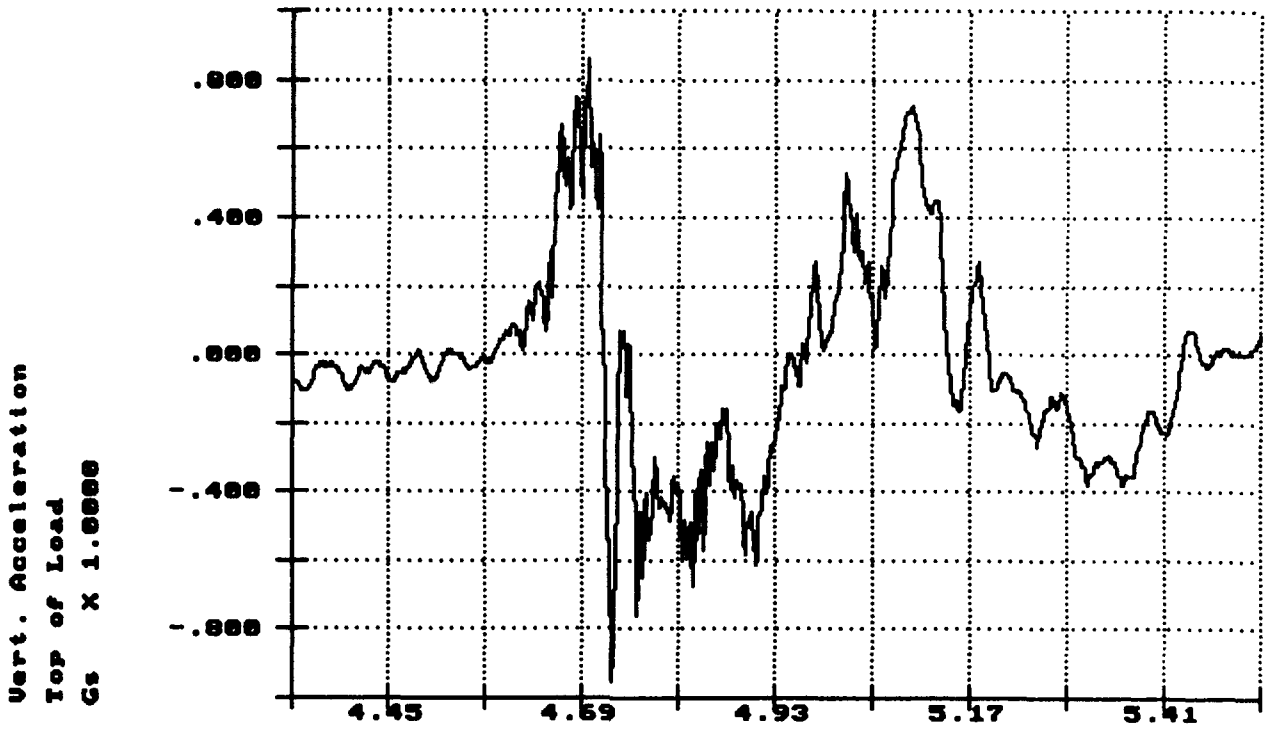
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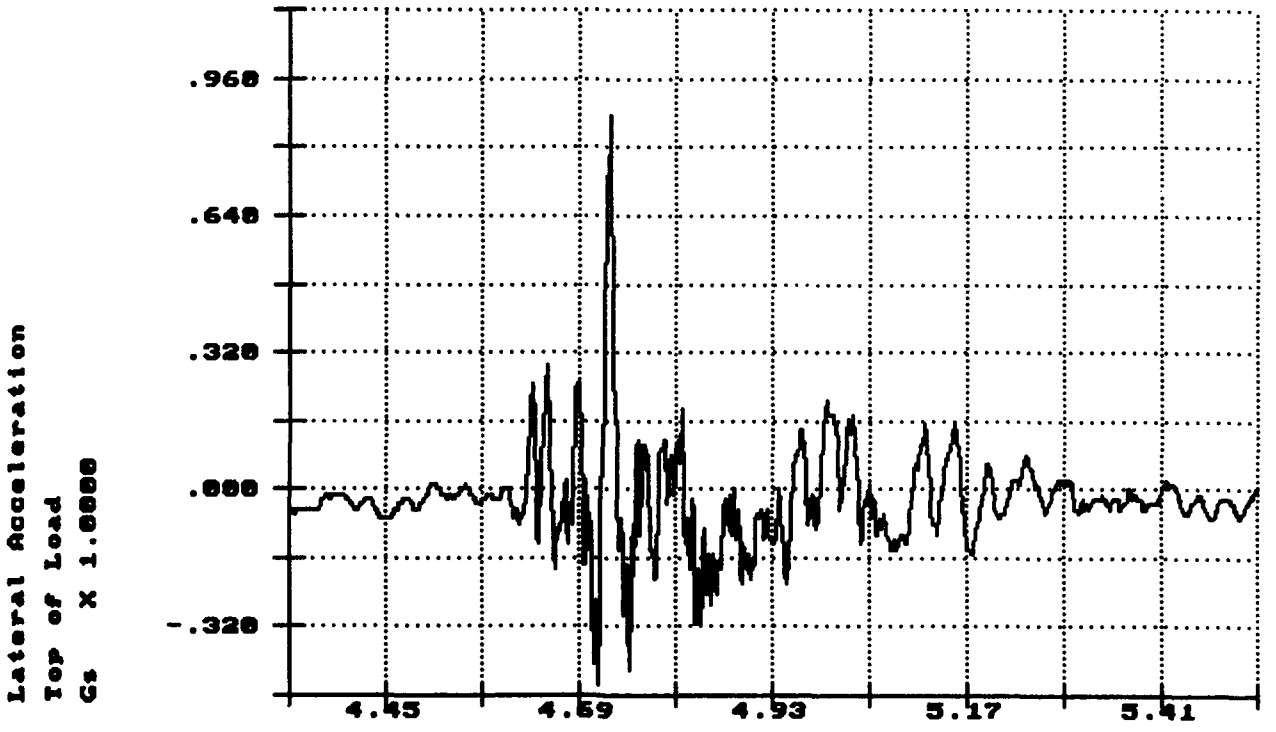
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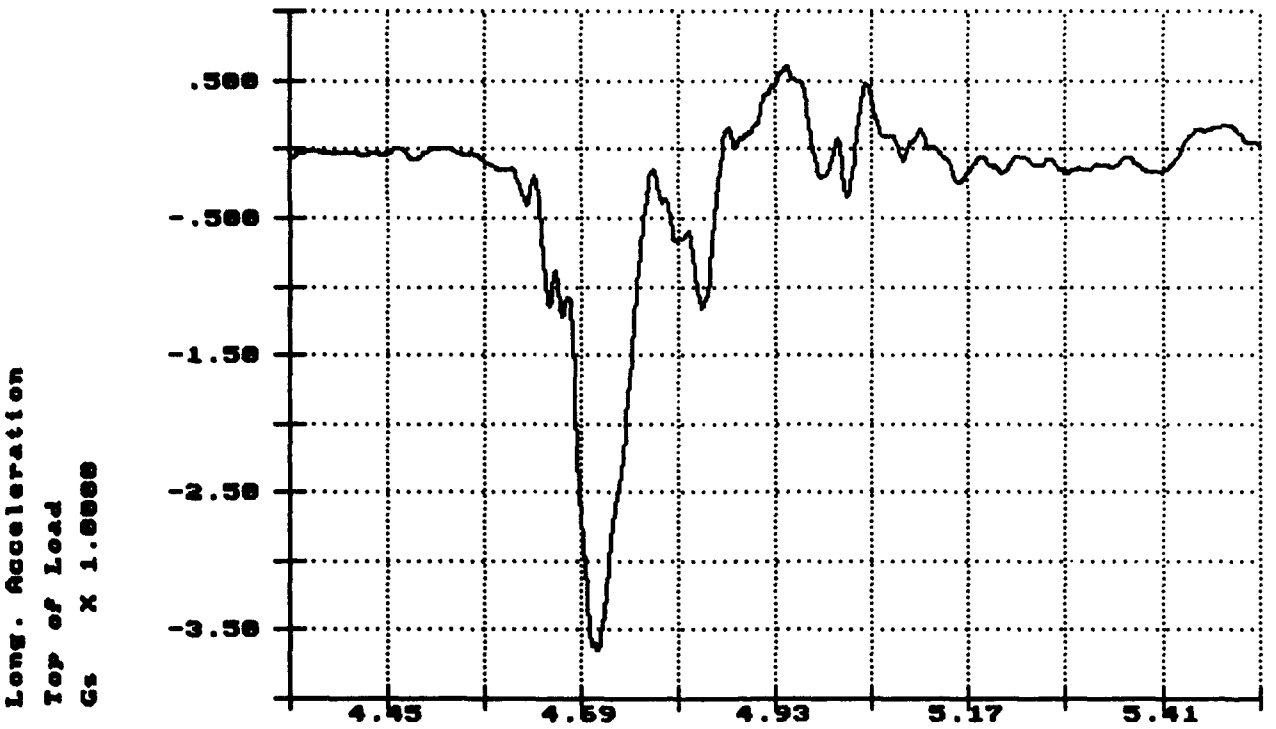
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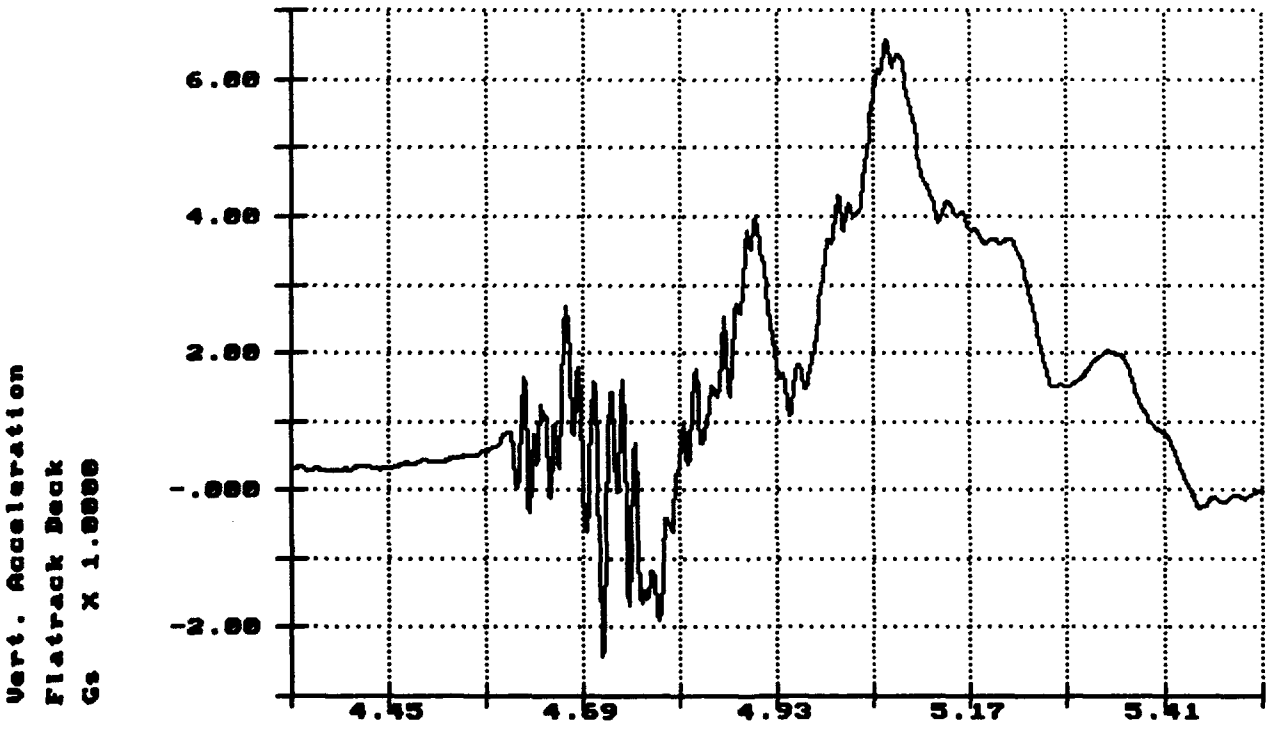
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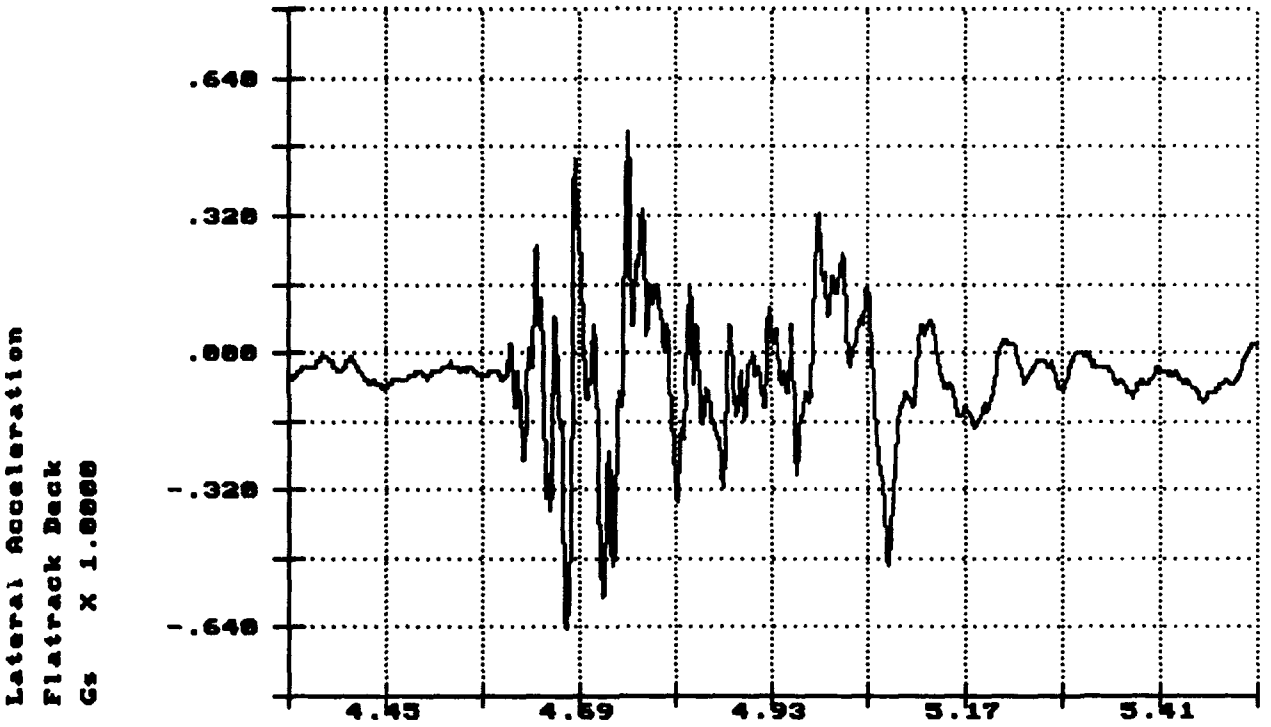
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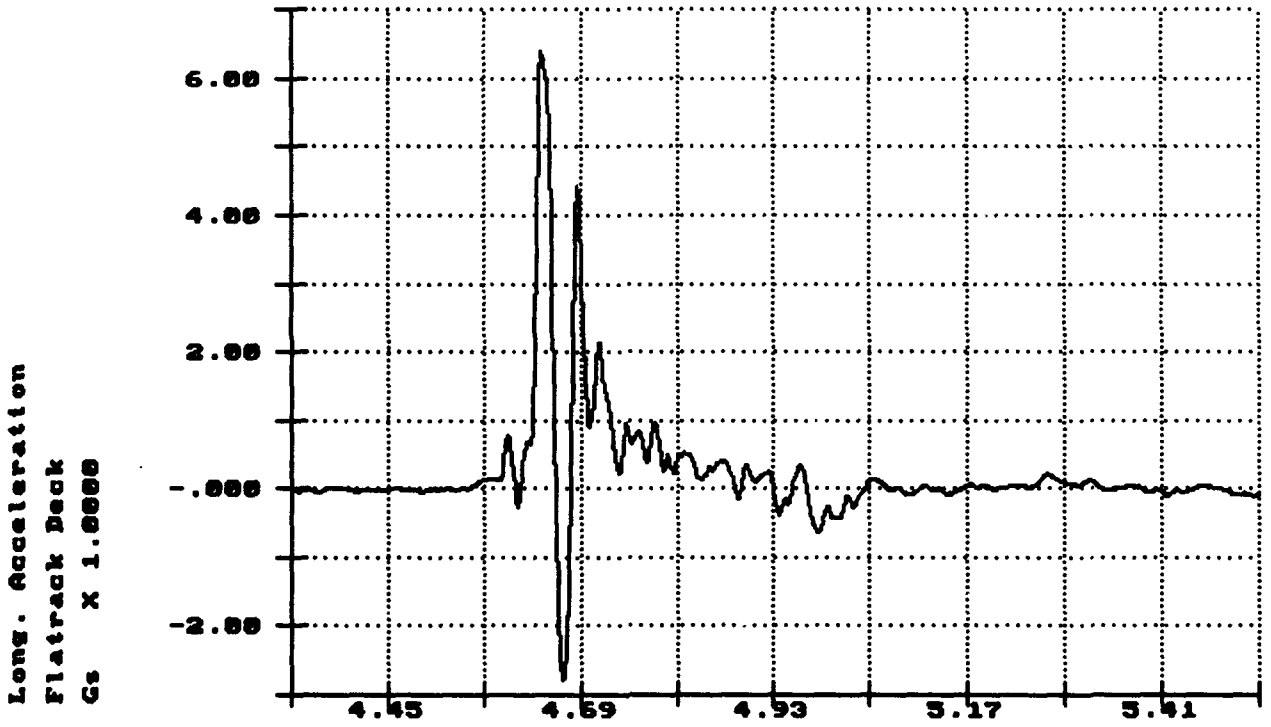
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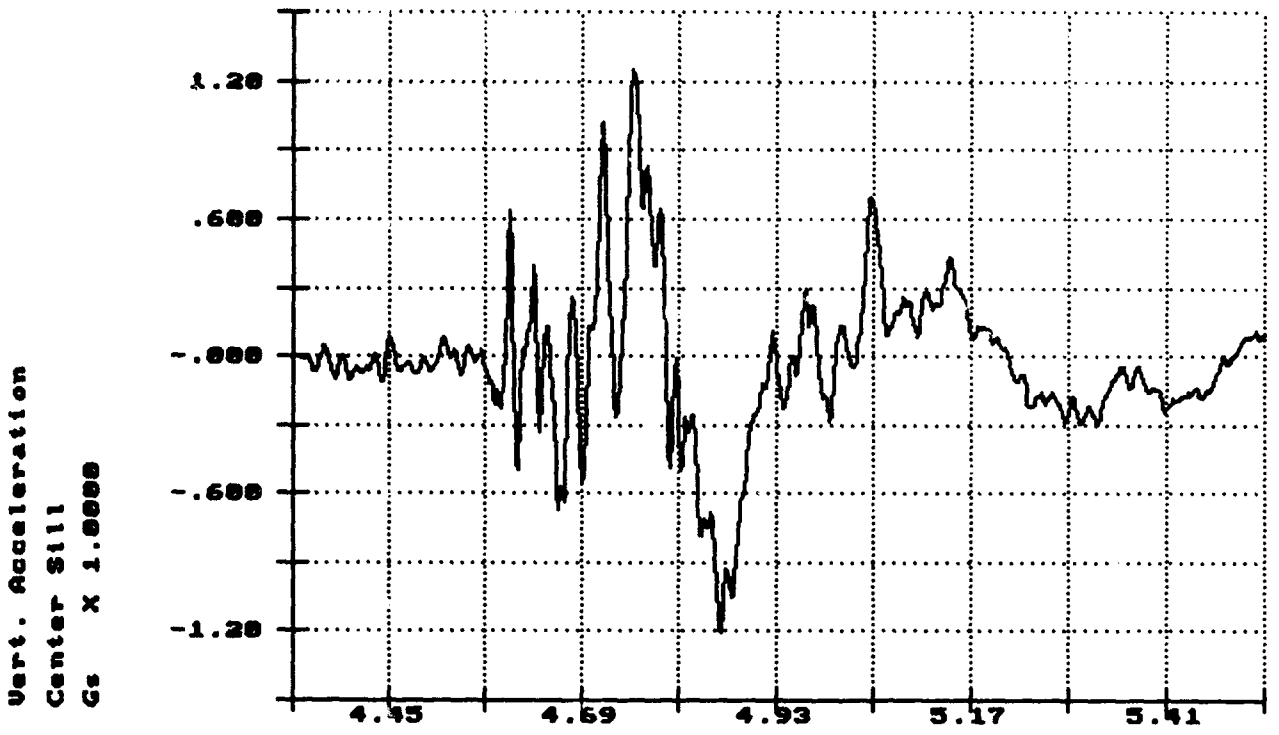
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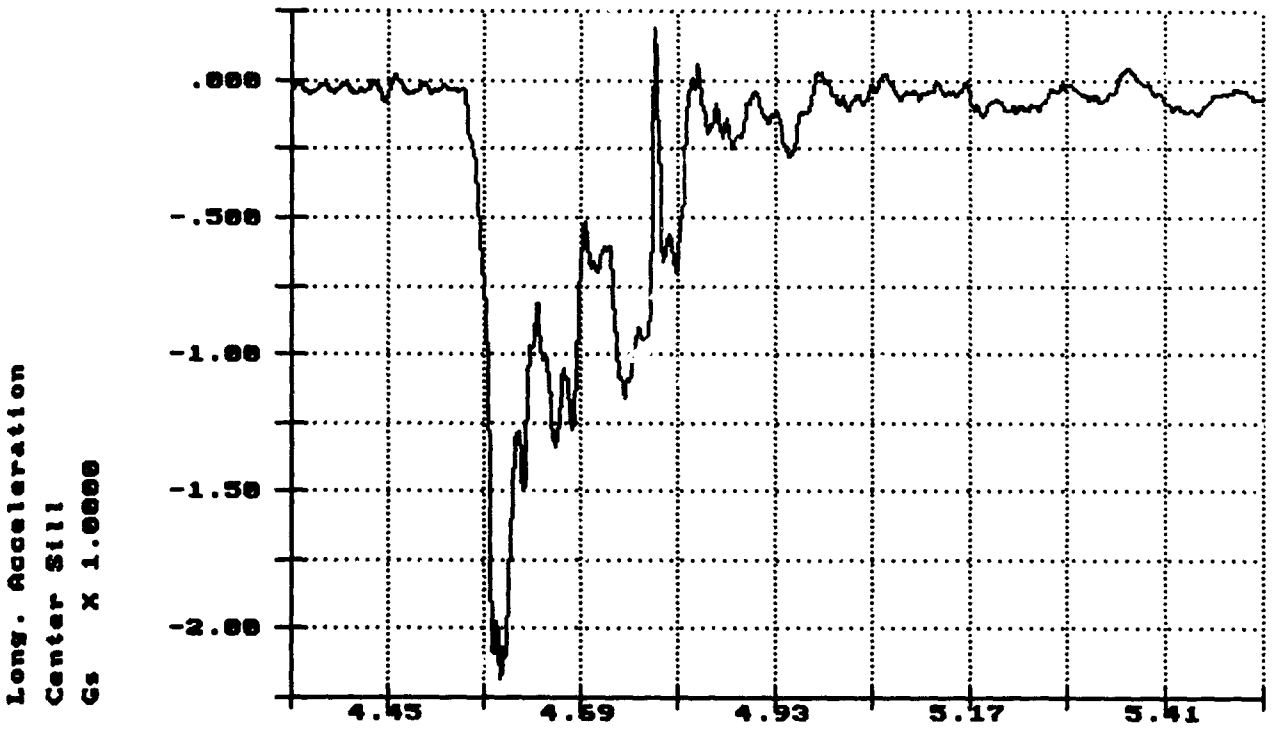
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R.I. of PLS Flatracks, Impact 4: 8.72MPH Dec 06 15:27:45 1993



R.I. of PLS Flatracks, Impact 4: 8.72MPH Dec 06 15:27:45 1993



TEST NO. 13

ROAD TEST DATA

Test No.: 13 Date: 7-8 December 1993

Specimen Load: EPF with propelling charge containers on wooden pallets on a container chassis.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.09 SEC	5.6 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	6.31 SEC	5.3 MPH

REMARKS: No damage to the EPF or load movement.

PASS 2-A OVER FIRST SERIES OF TIES:	6.07 SEC	5.3 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	6.22 SEC	5.2 MPH

REMARKS: No damage to the EPF or load movement.

30-MILE ROAD TEST: No damage or load movement.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	6.44 SEC	5.3 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	6.21 SEC	5.5 MPH

REMARKS: No damage or load movement.

PASS 4-A OVER FIRST SERIES OF TIES:	6.41 SEC	5.1 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	.01 SEC	5.4 MPH

REMARKS: No damage or load movement.

WASHBOARD COURSE: No observed damage or load movement.

SHIPBOARD TRANSPORTATION SIMULATOR: No damage or load movement.

TEST NO. 14

ROAD TEST DATA

Test No.: 14 Date: 7-9 December 1993

Specimen Load: EPF with MLRS pods on a container chassis.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.27 SEC	5.4 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	6.64 SEC	5.1 MPH

REMARKS: No damage to the EPF or load movement.

PASS 2-A OVER FIRST SERIES OF TIES:	6.07 SEC	5.3 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	6.45 SEC	5.1 MPH

REMARKS: No damage to the EPF or load movement.

30-MILE ROAD TEST: No damage or load movement.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	6.19 SEC	5.5 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	6.23 SEC	5.5 MPH

REMARKS: No damage or load movement.

PASS 4-A OVER FIRST SERIES OF TIES:	6.28 SEC	5.2 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	6.44 SEC	5.1 MPH

REMARKS: No damage or load movement.

WASHBOARD COURSE: No observed damage or load movement.

SHIPBOARD TRANSPORTATION SIMULATOR: No damage or load movement.

TEST NO. 15

RAIL IMPACT DATA

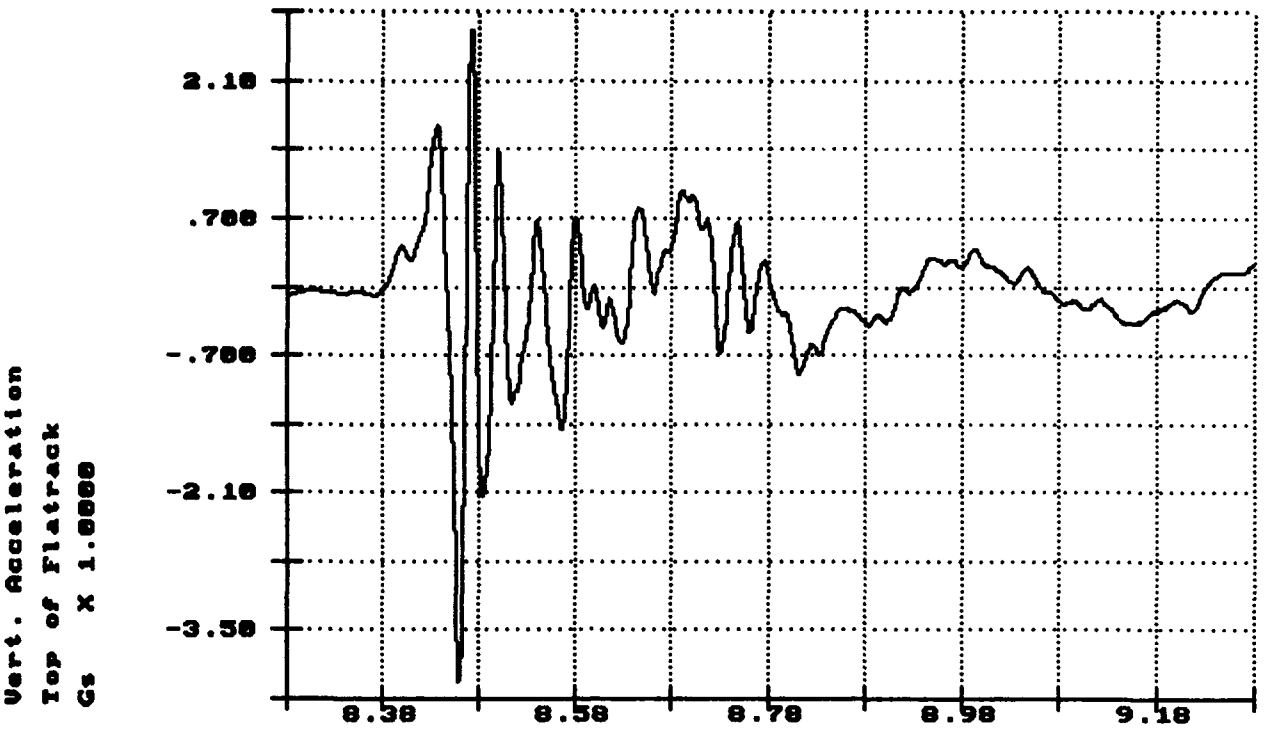
Test No.: 15 Date: 9 December 1993

Specimen Load: PLS trailer with an EPF loaded with MLRS pods.

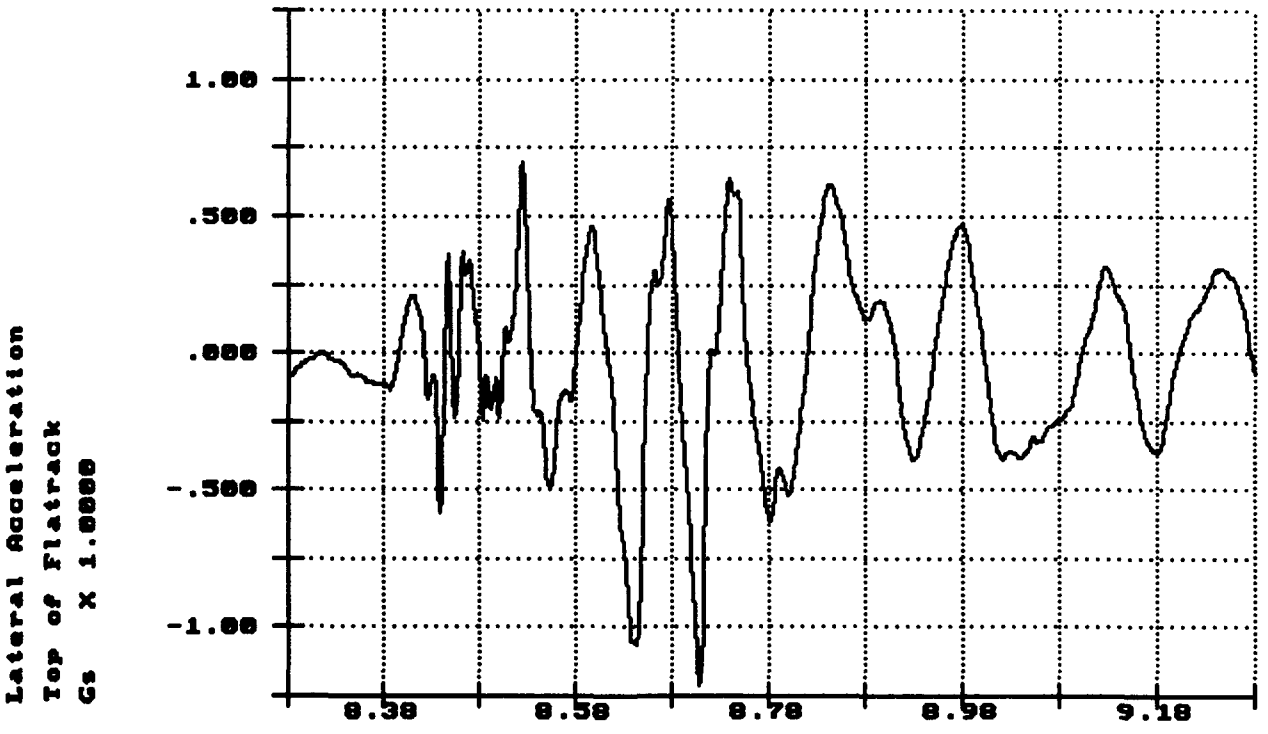
Flatcar No.: EJ&E 6099	Lt. Wt.: 56,200
PLS Trailer	Wt.: 13,240
EPF No. 2	Wt.: 7,500
Lading, MLRS Pods	Wt.: 22,000
	Total Specimen Wt.: 98,940
	Buffer Car (five cars) Wt.: 250,000

Impact	End Struck	Velocity	Remarks
1	Forward	4.49	No load movement.
2	Forward	6.25	1/8-inch compression in 4- by 4-inch blocking from metal angle assembly on the bottom MLRS pods. The EPF shifted 1-inch from rear stops. The EPF retainer pin could not be removed.
3	Forward	8.82	No additional compression. Floorline blocking started to pull out of the floor.
4	Rear	8.93	The EPF shifted 1-inch to the starting loaded position. The retainer pin between the EPF and the trailer is removable.

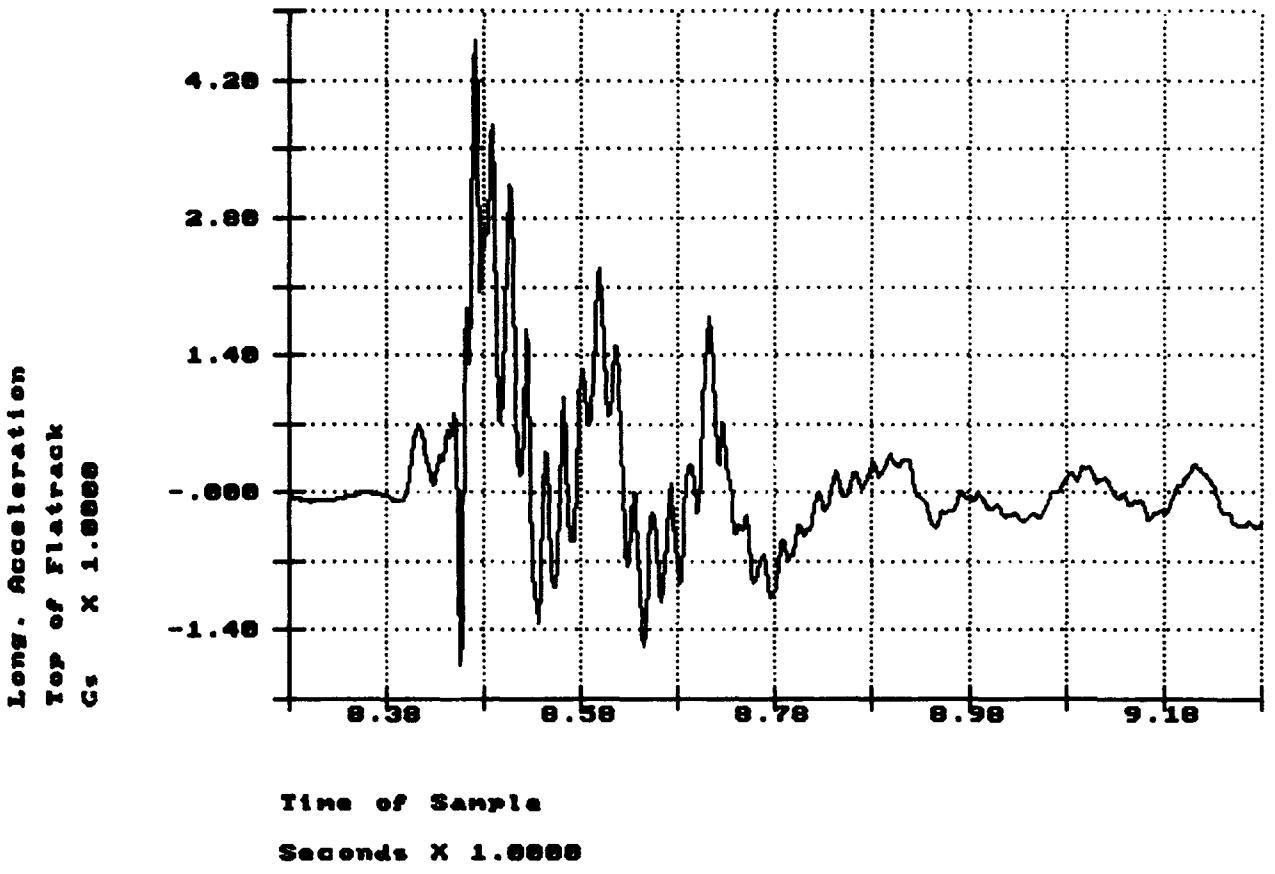
R.I. of PLS Flatrack, Impact 1: 4.34MPH Dec 09 09:44:35 1993



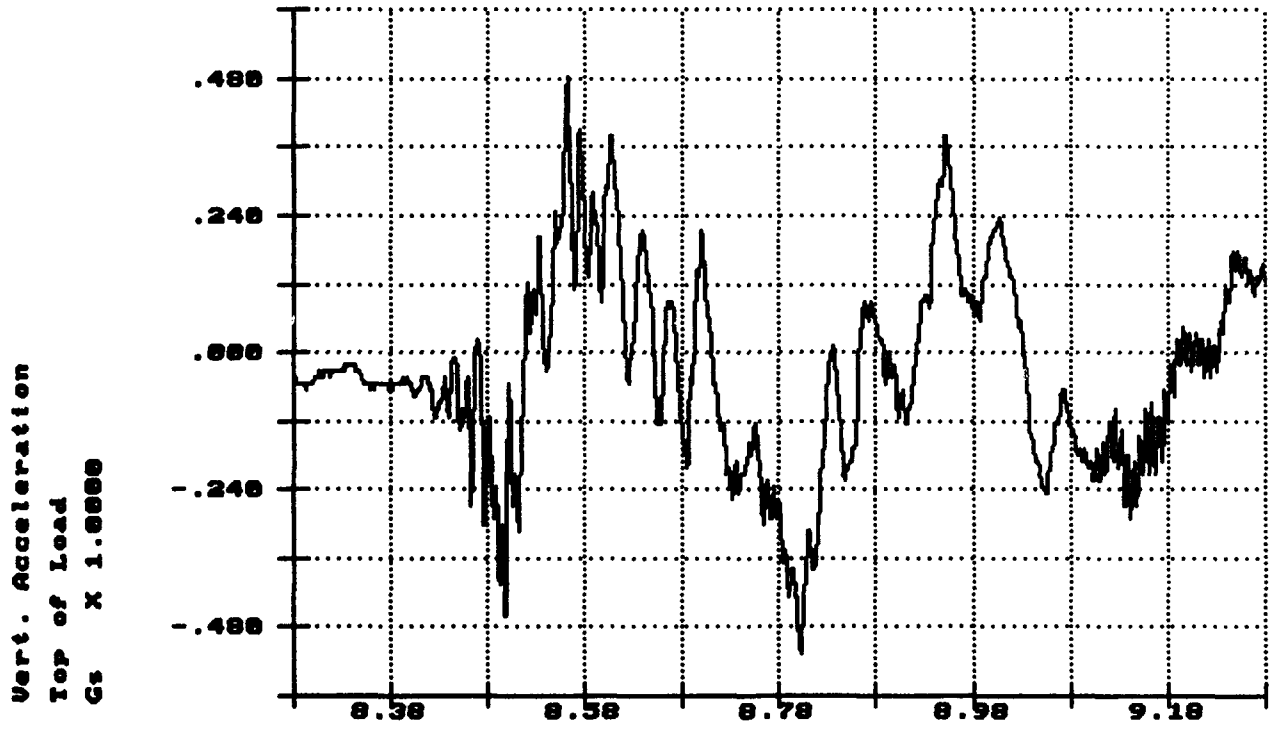
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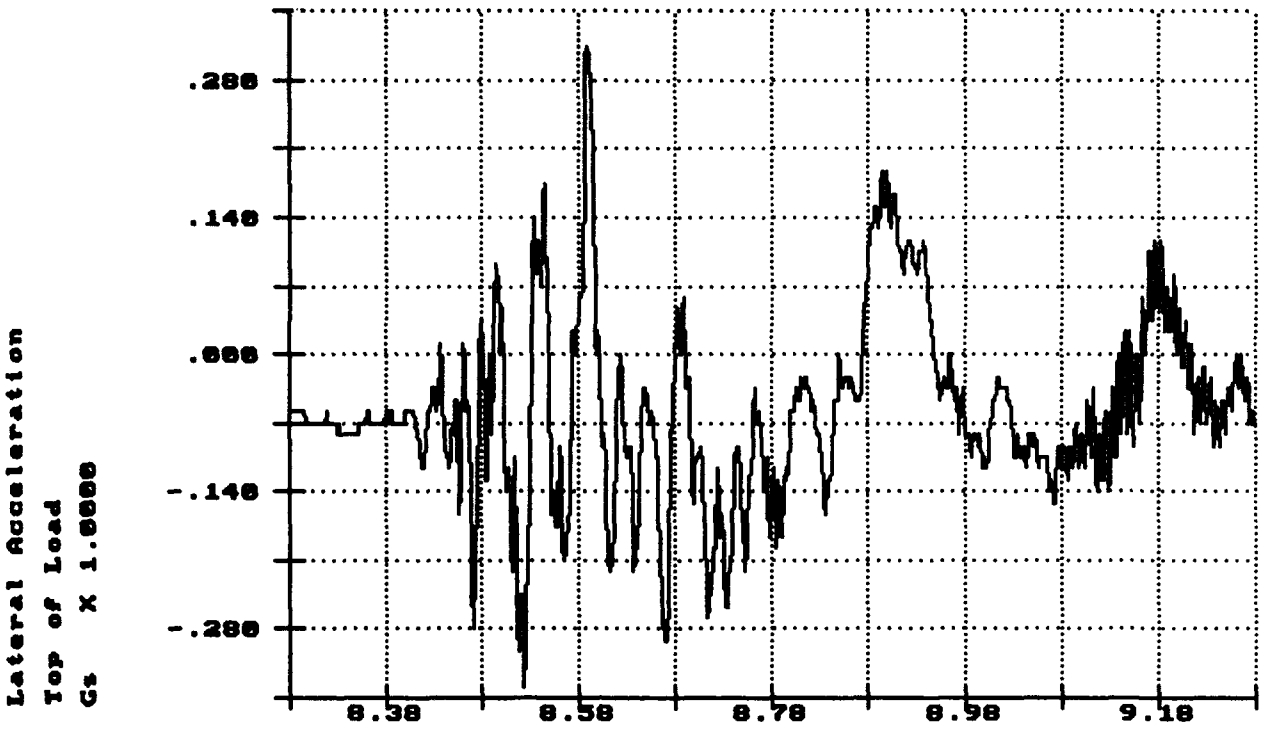
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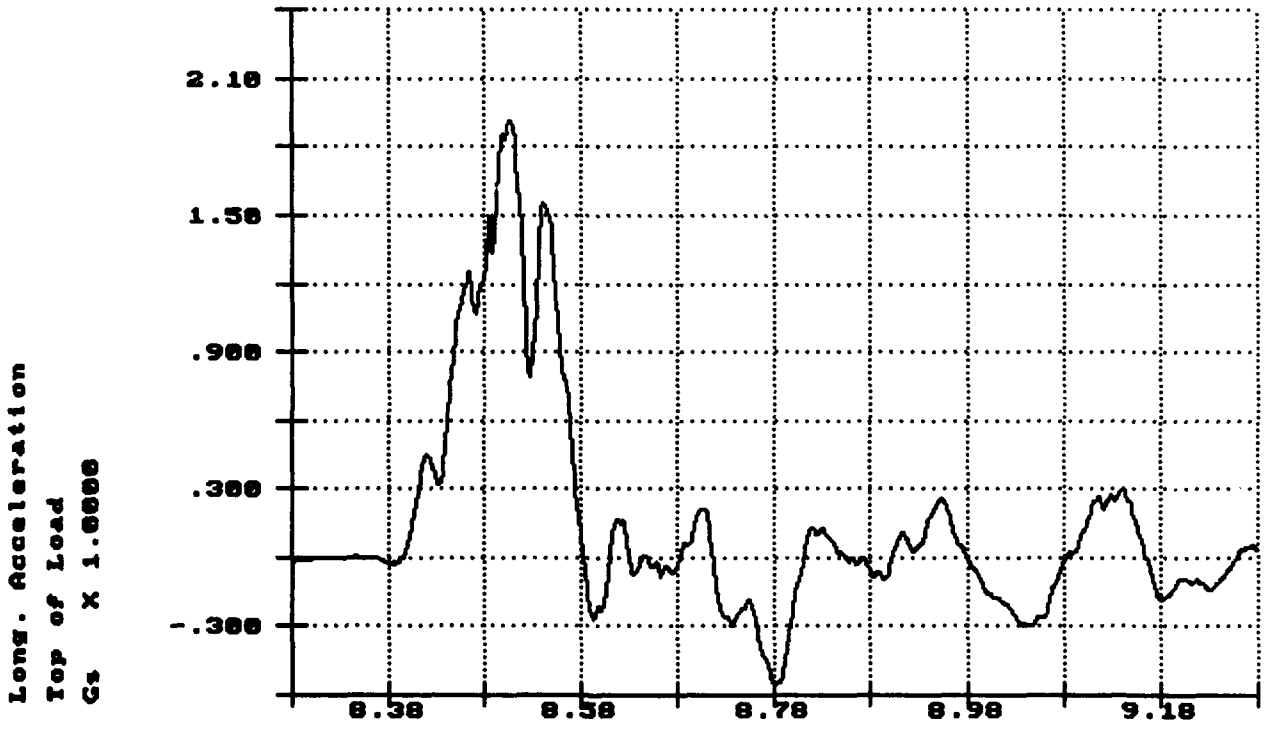
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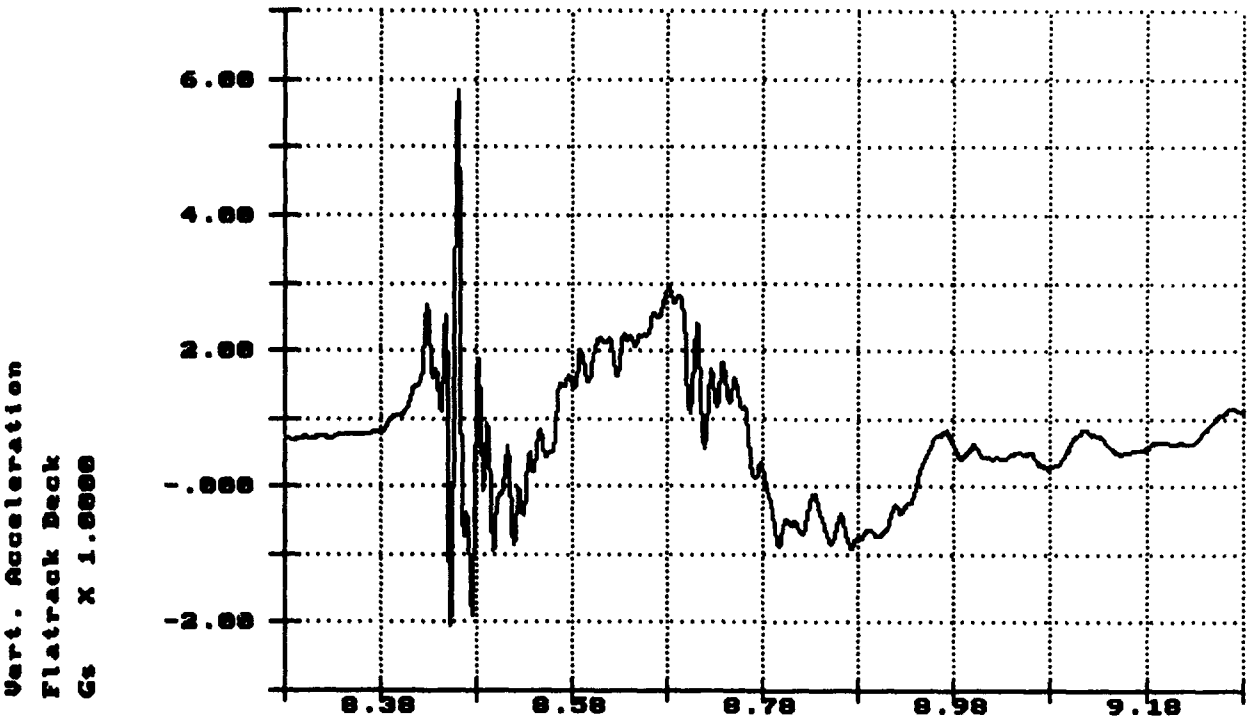
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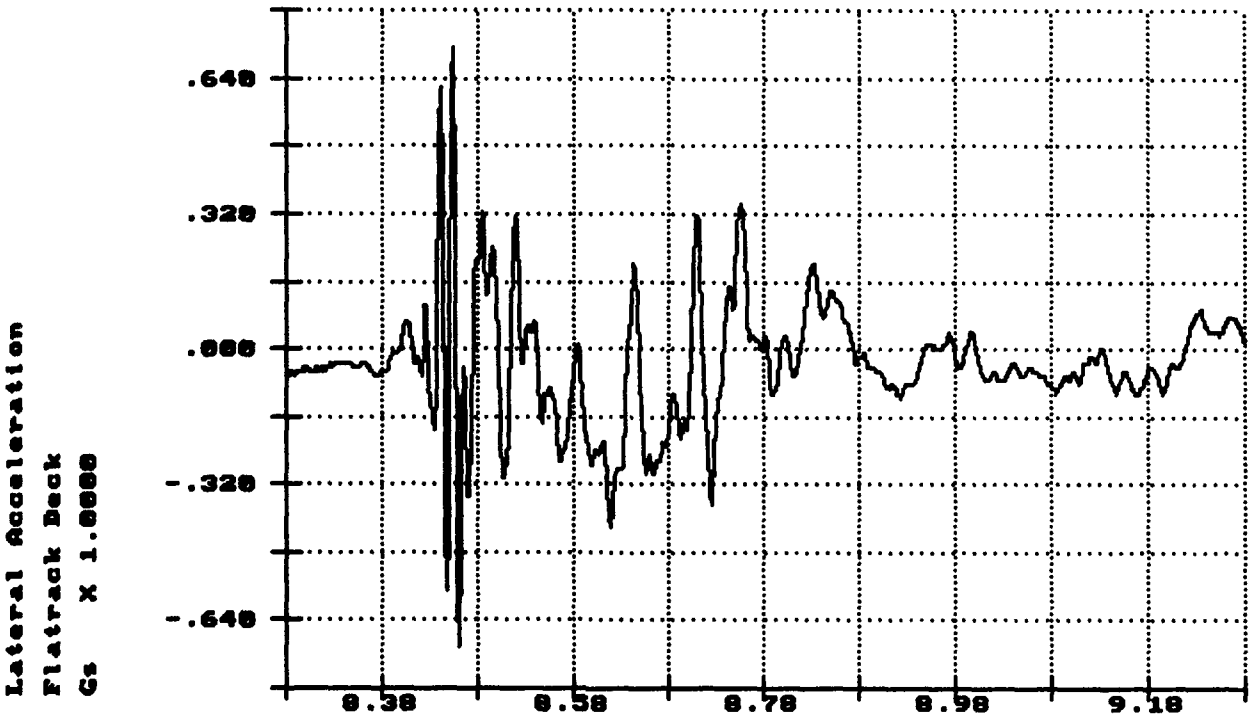
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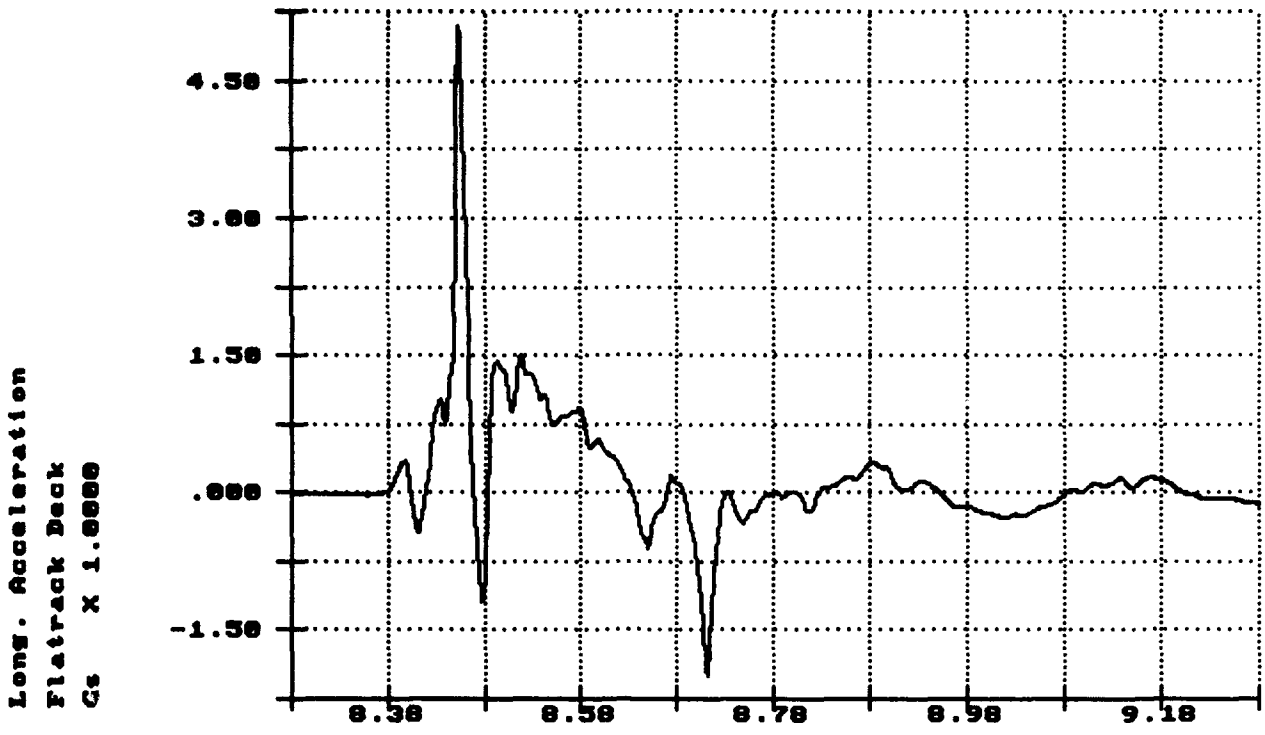
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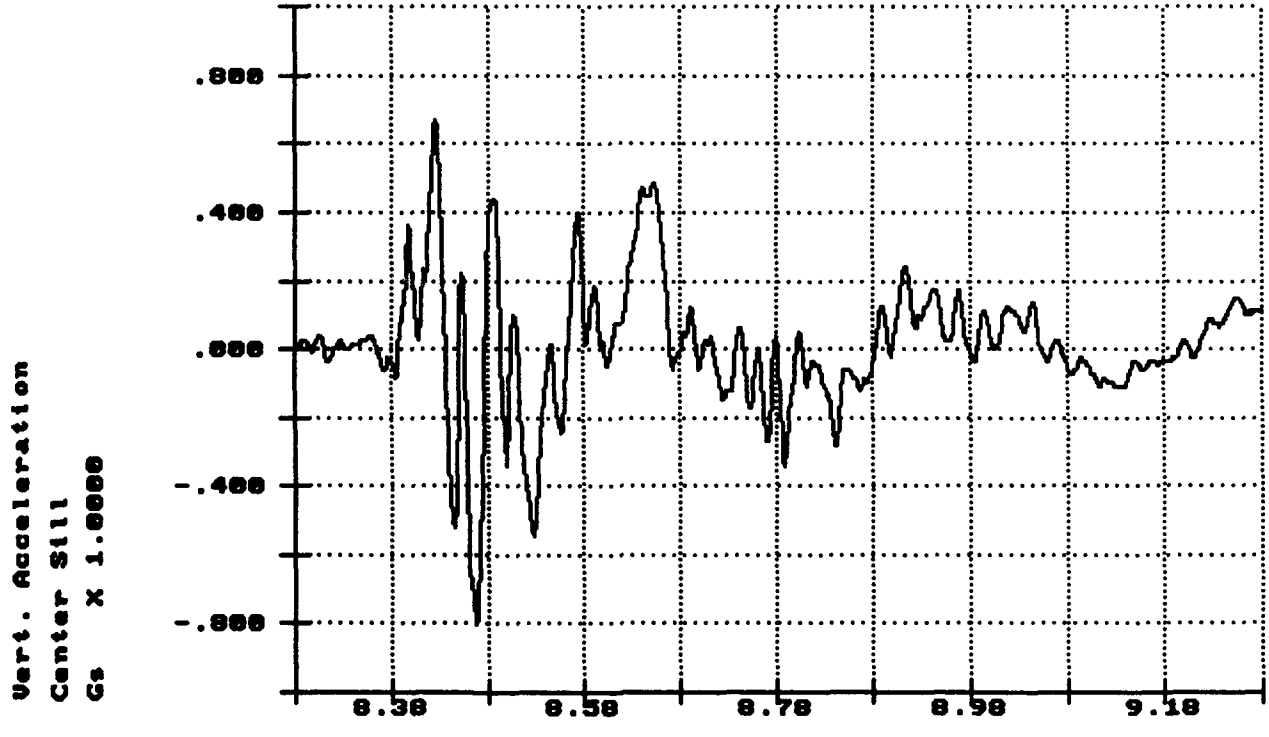
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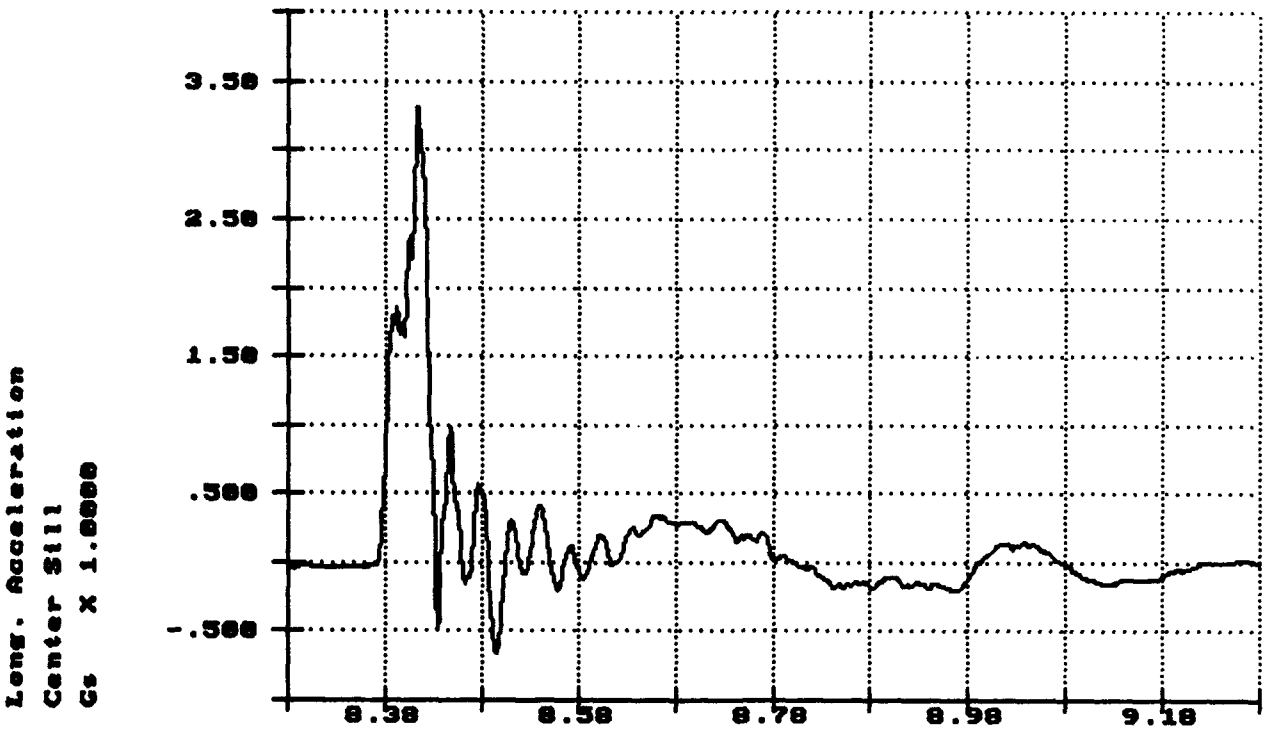
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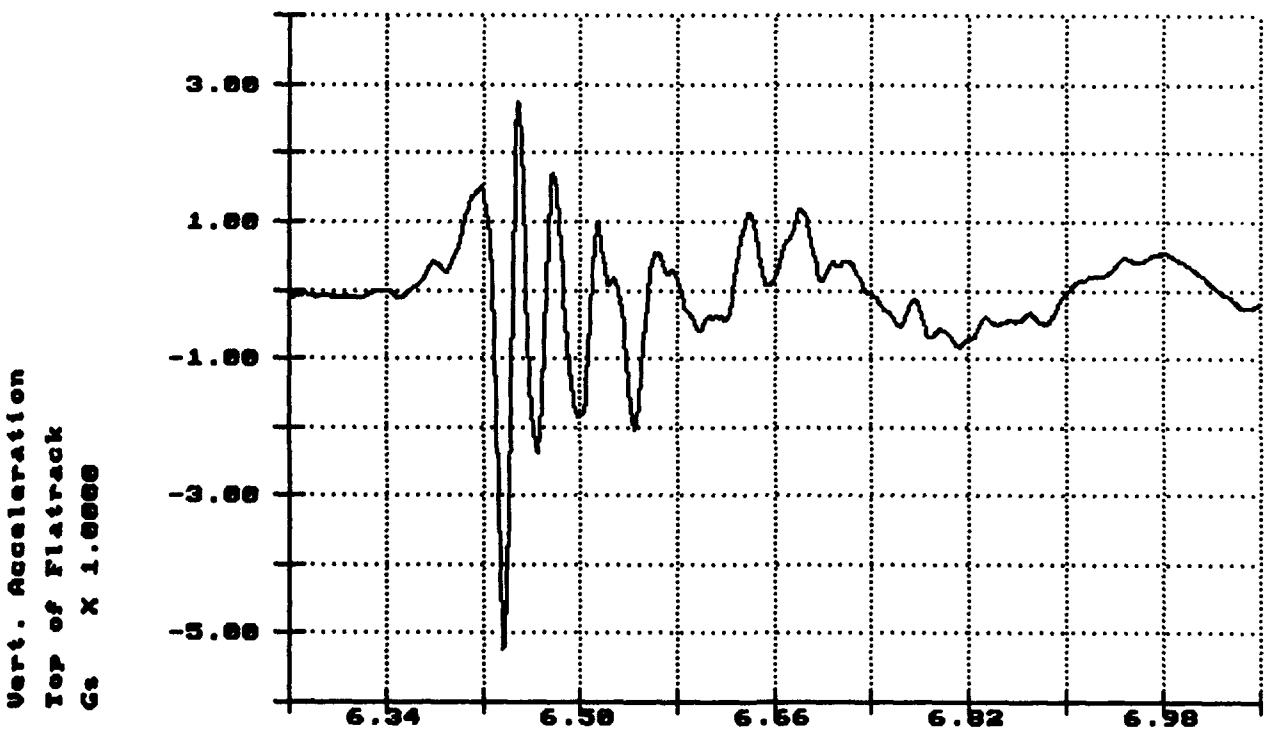
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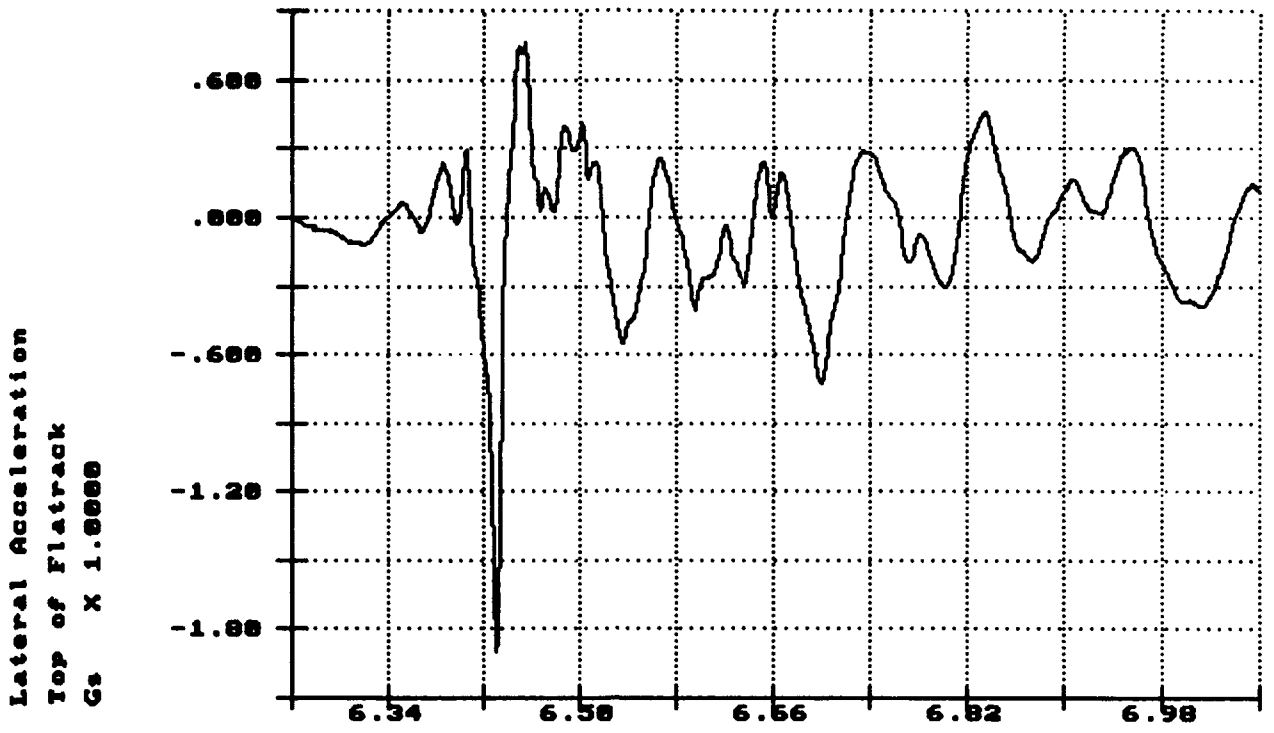
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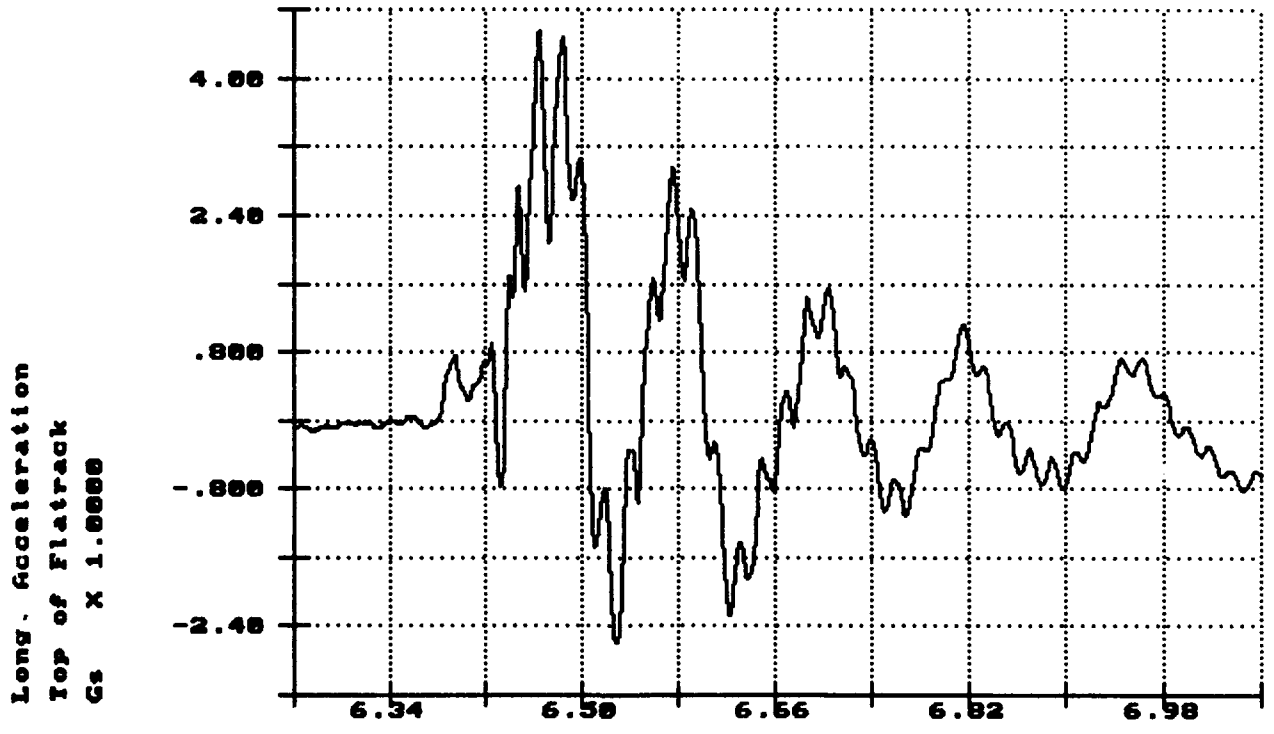
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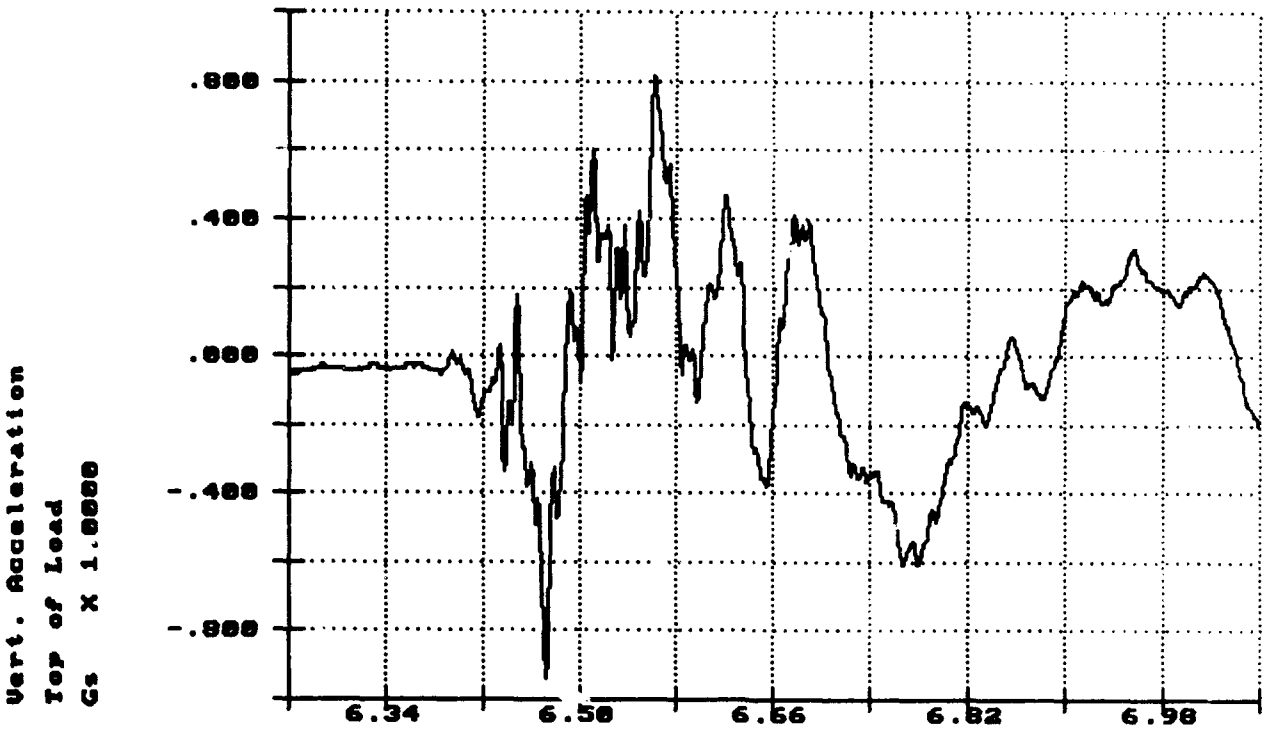
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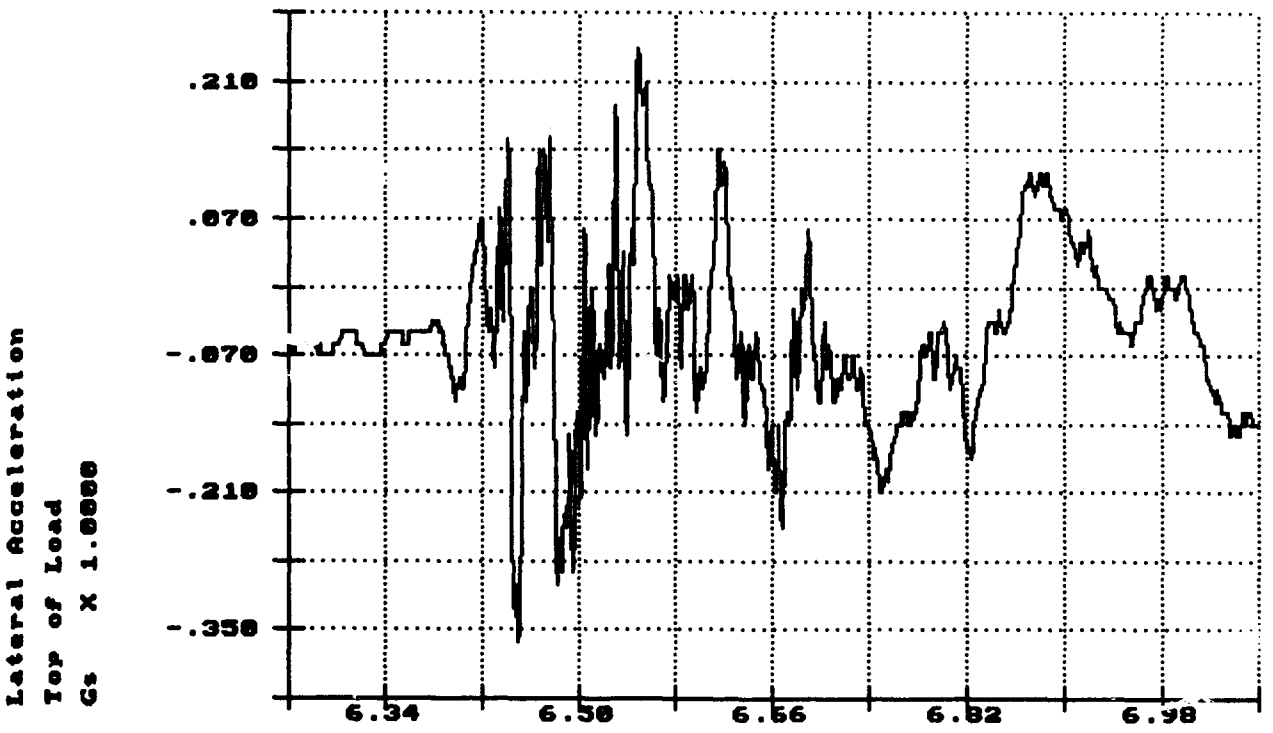
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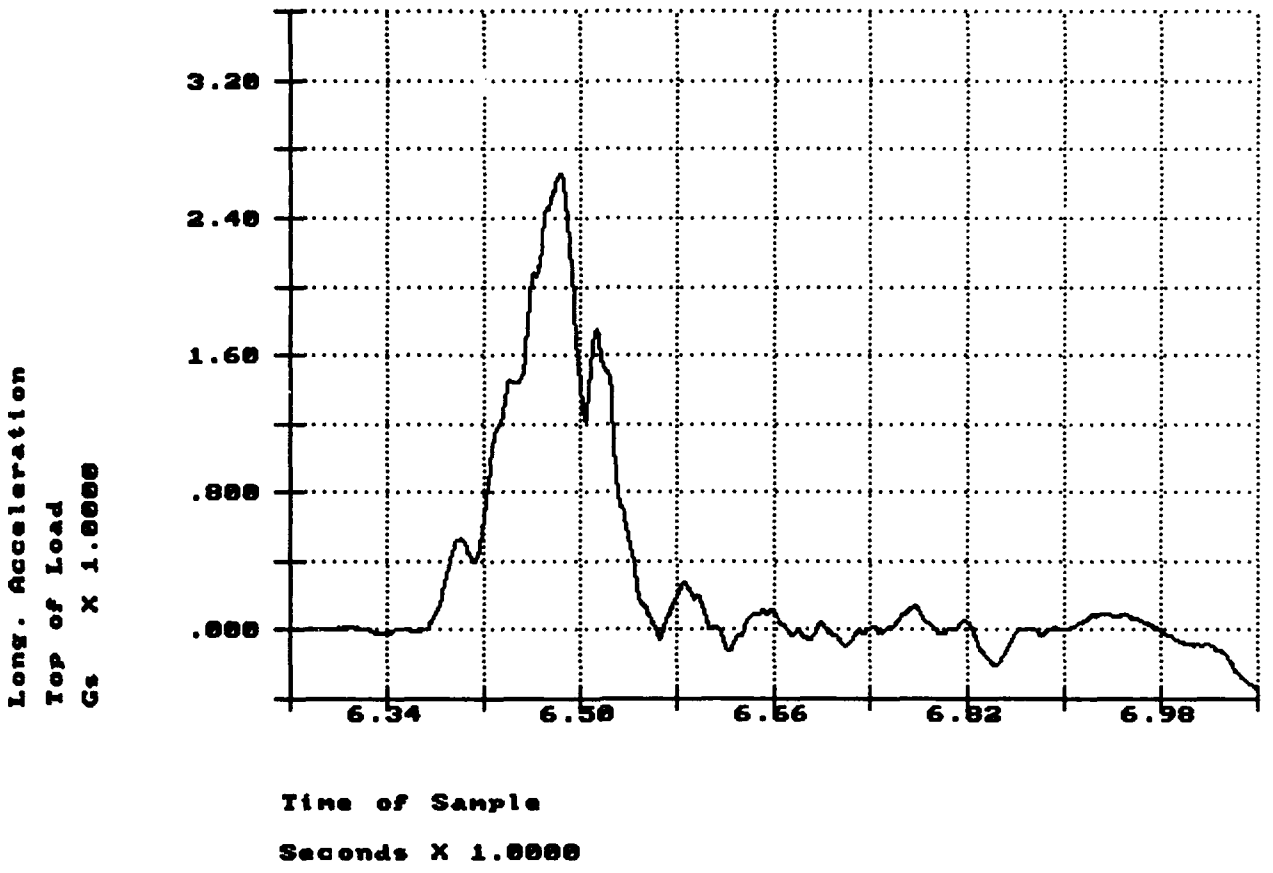
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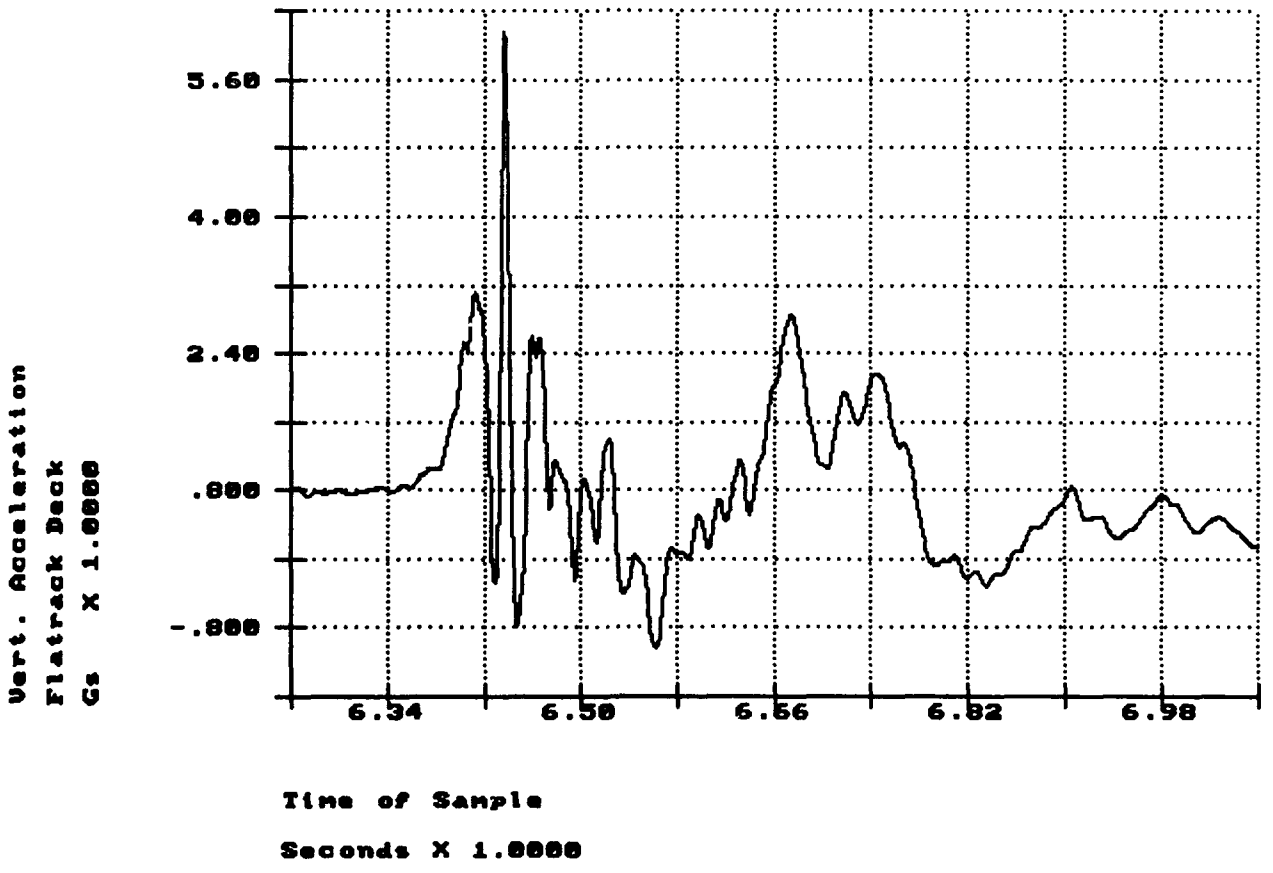
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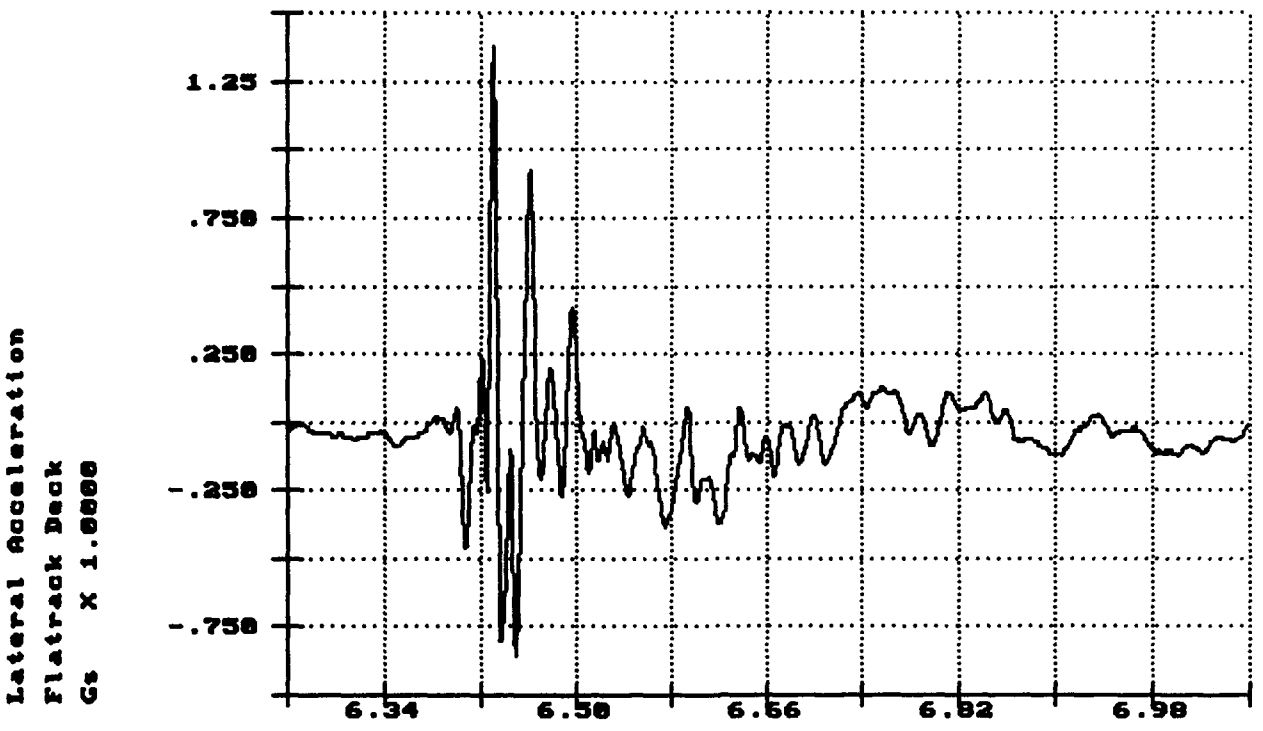
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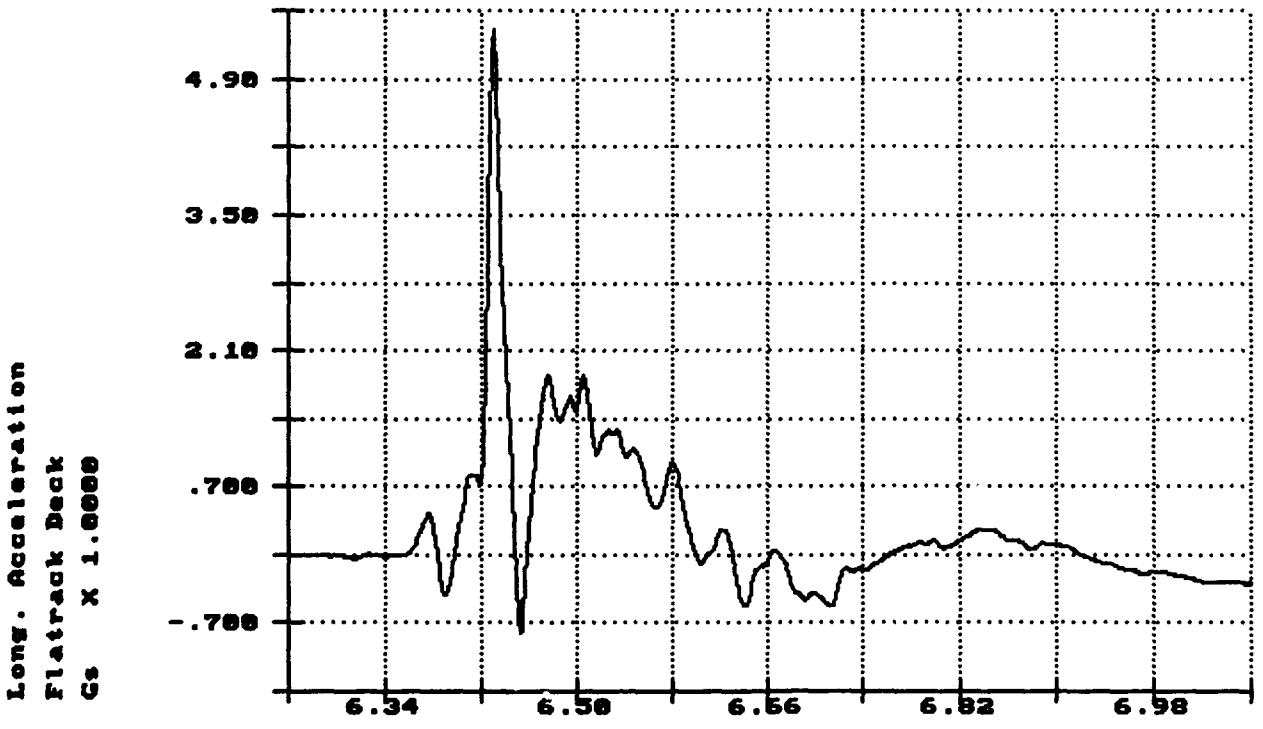
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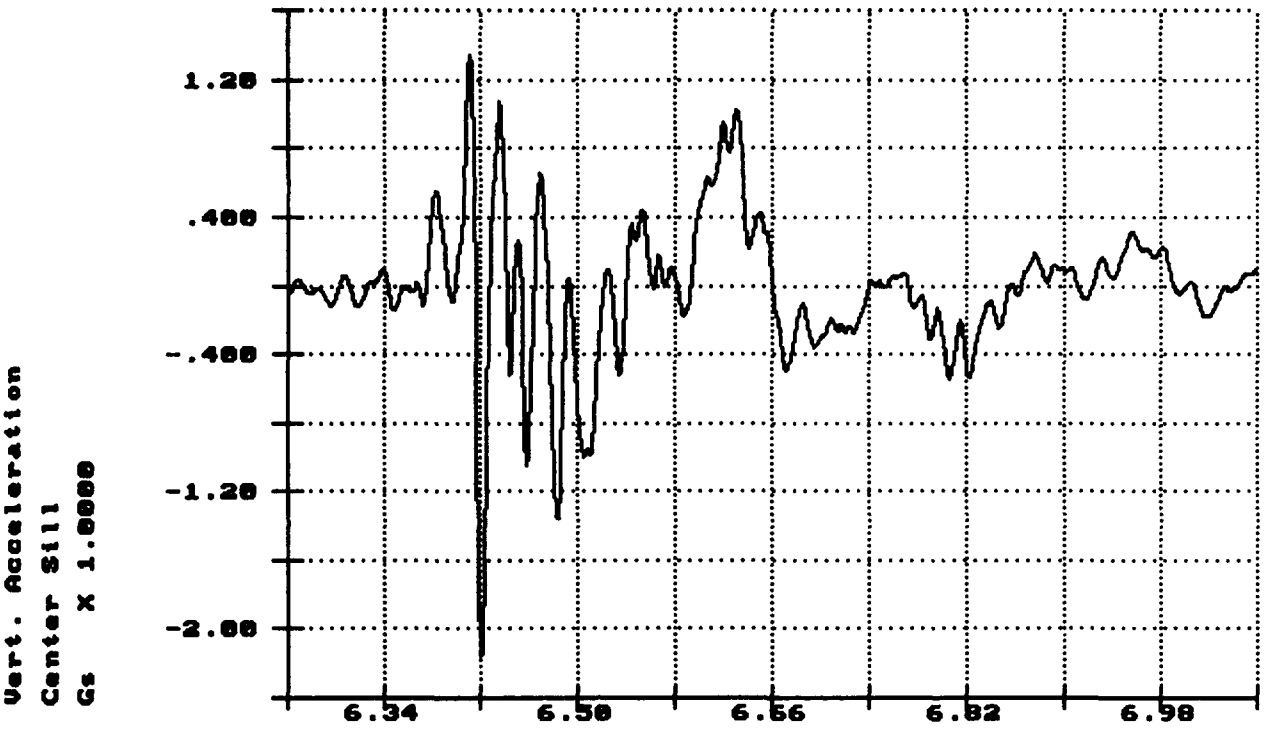
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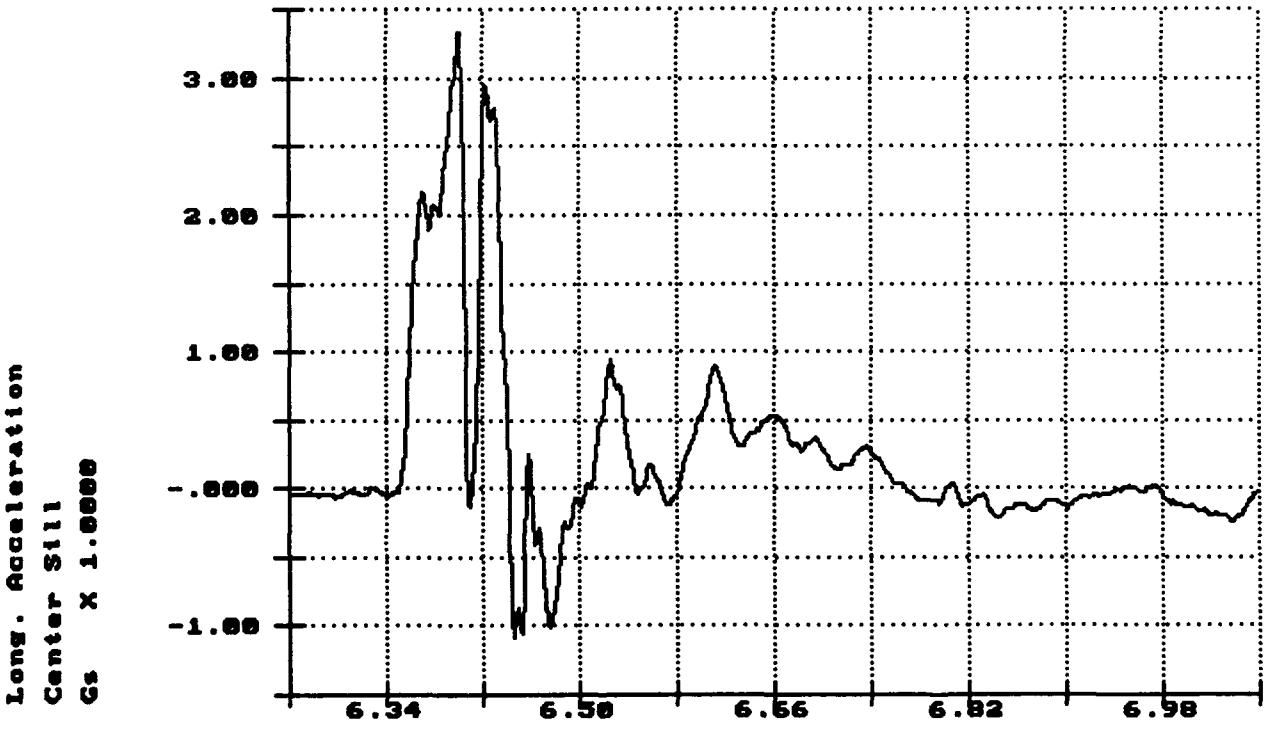
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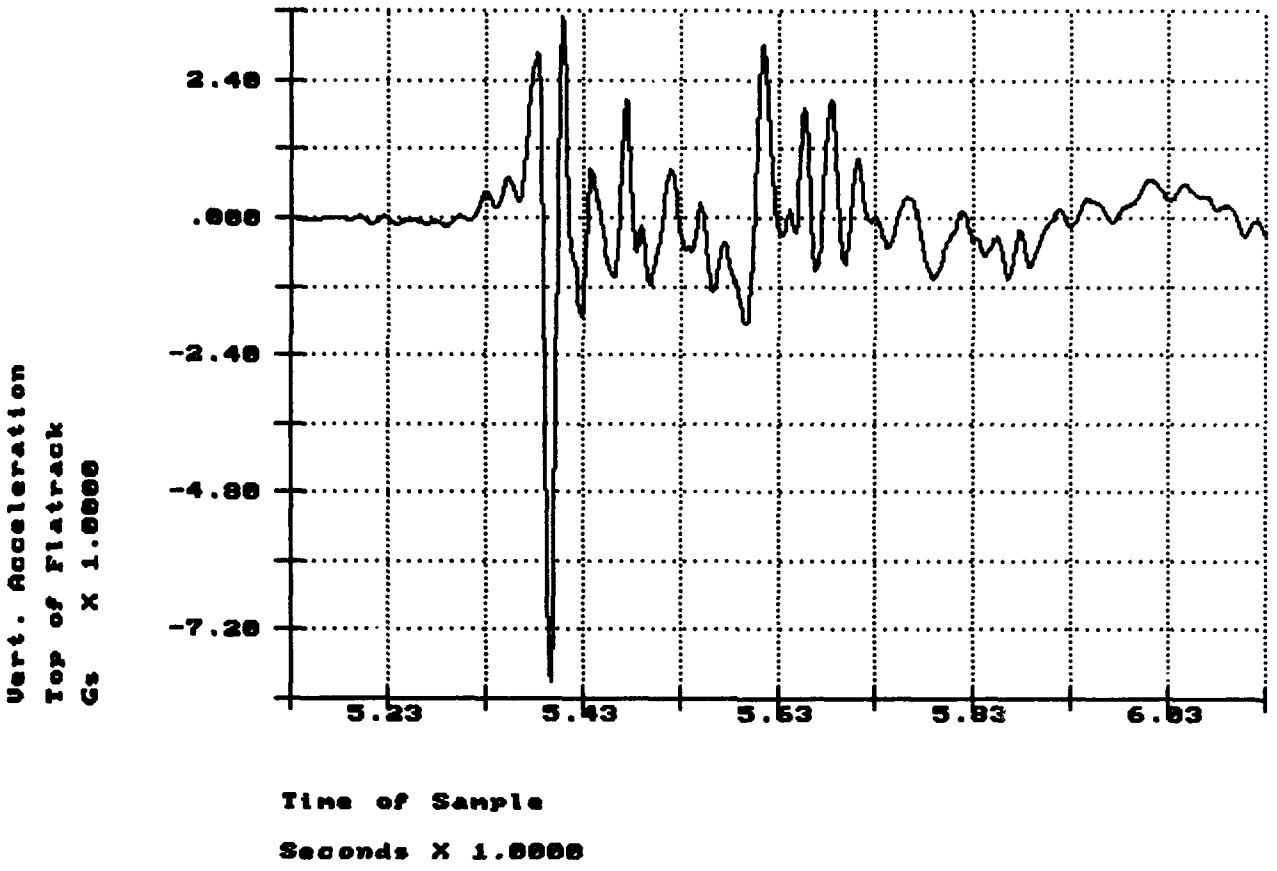
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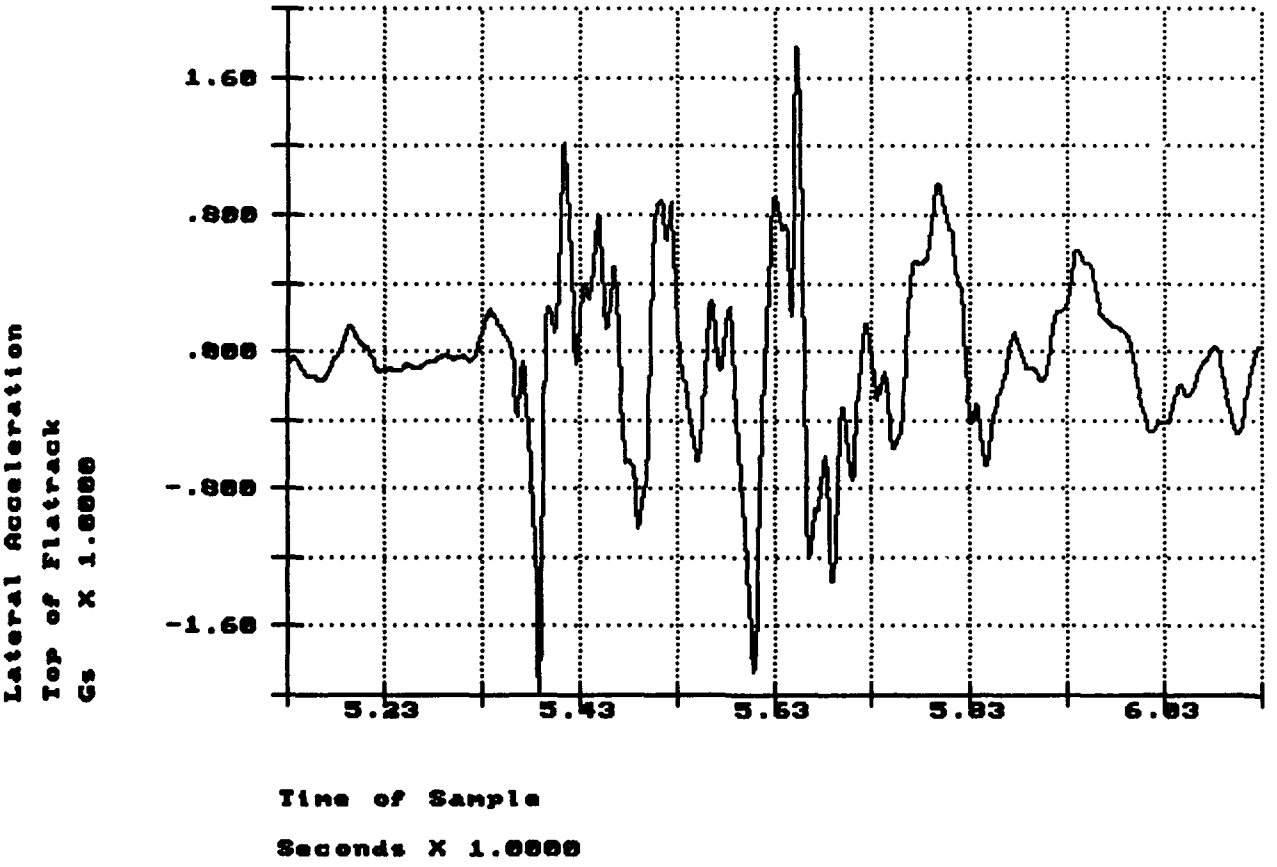
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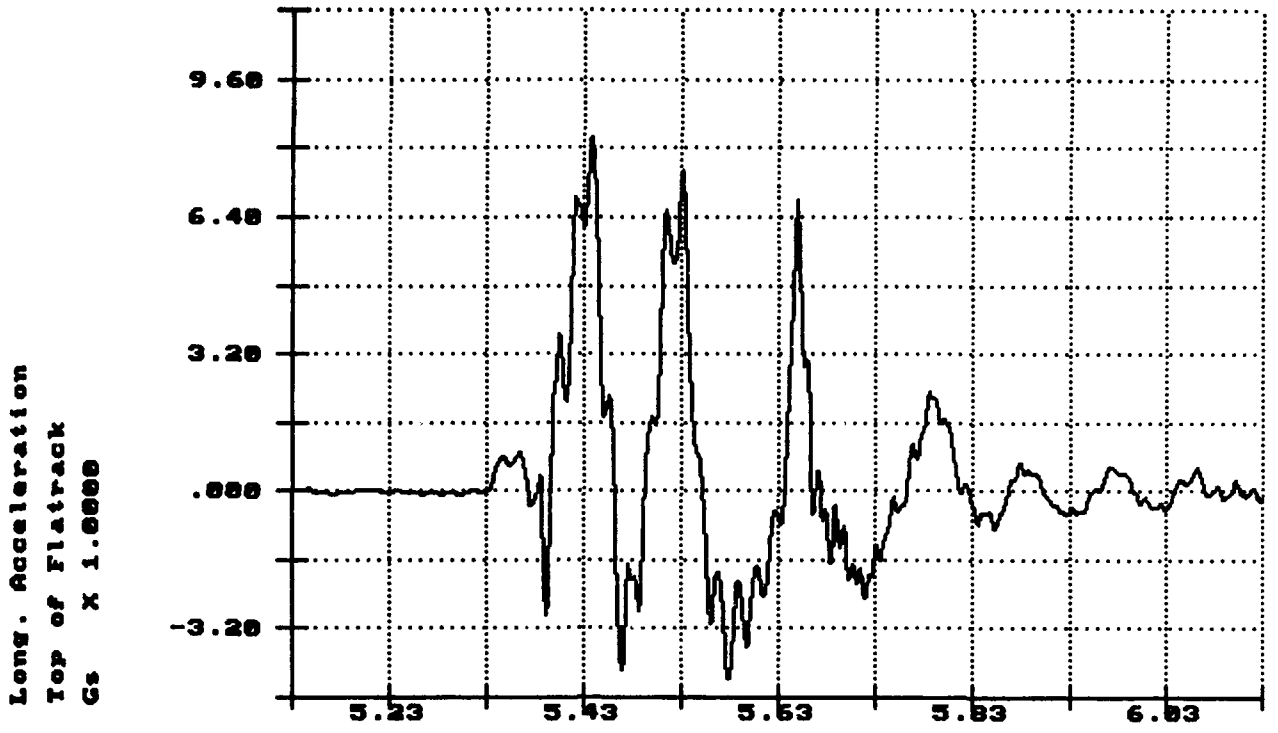
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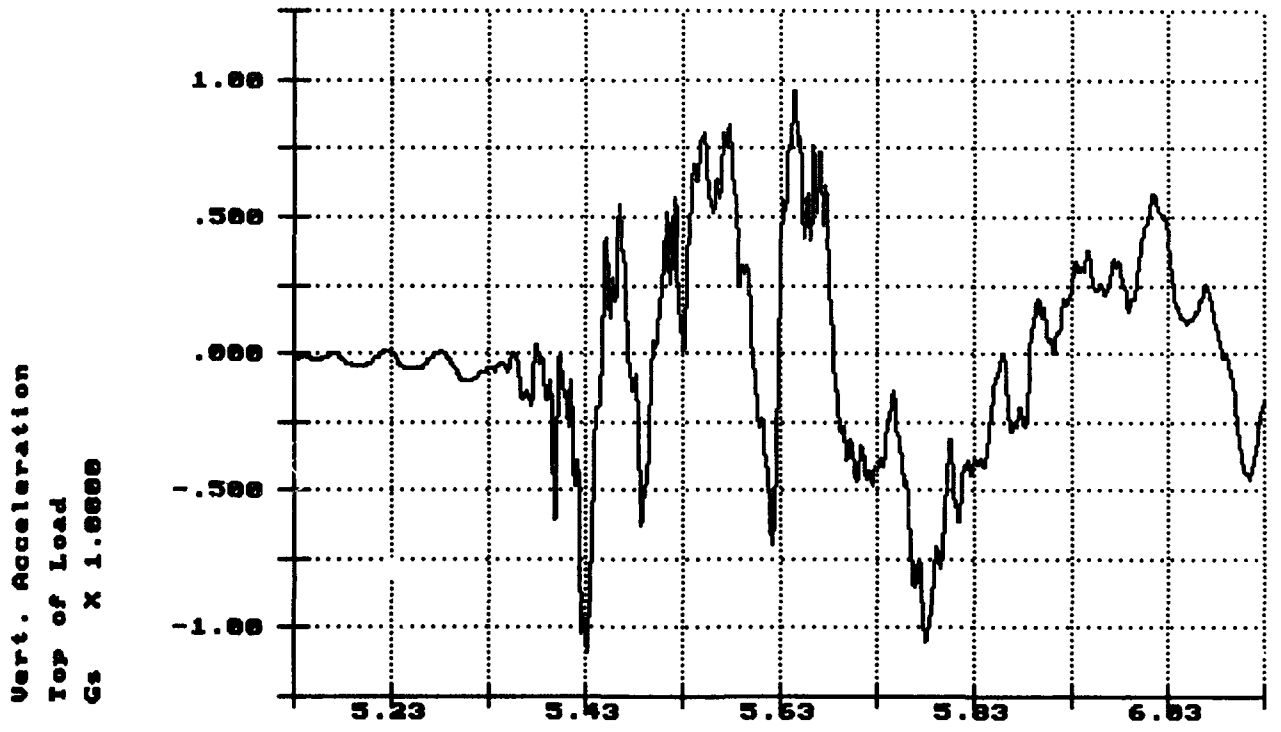
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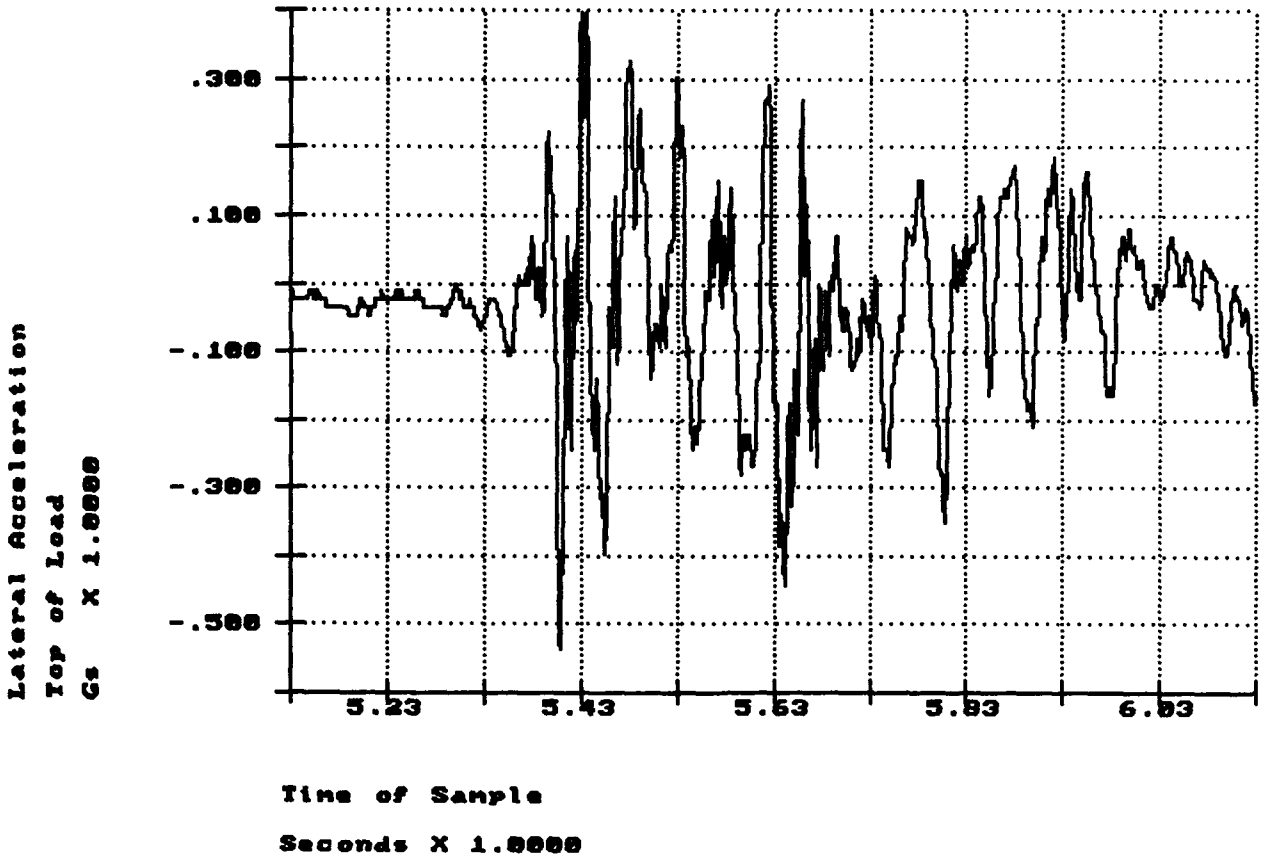
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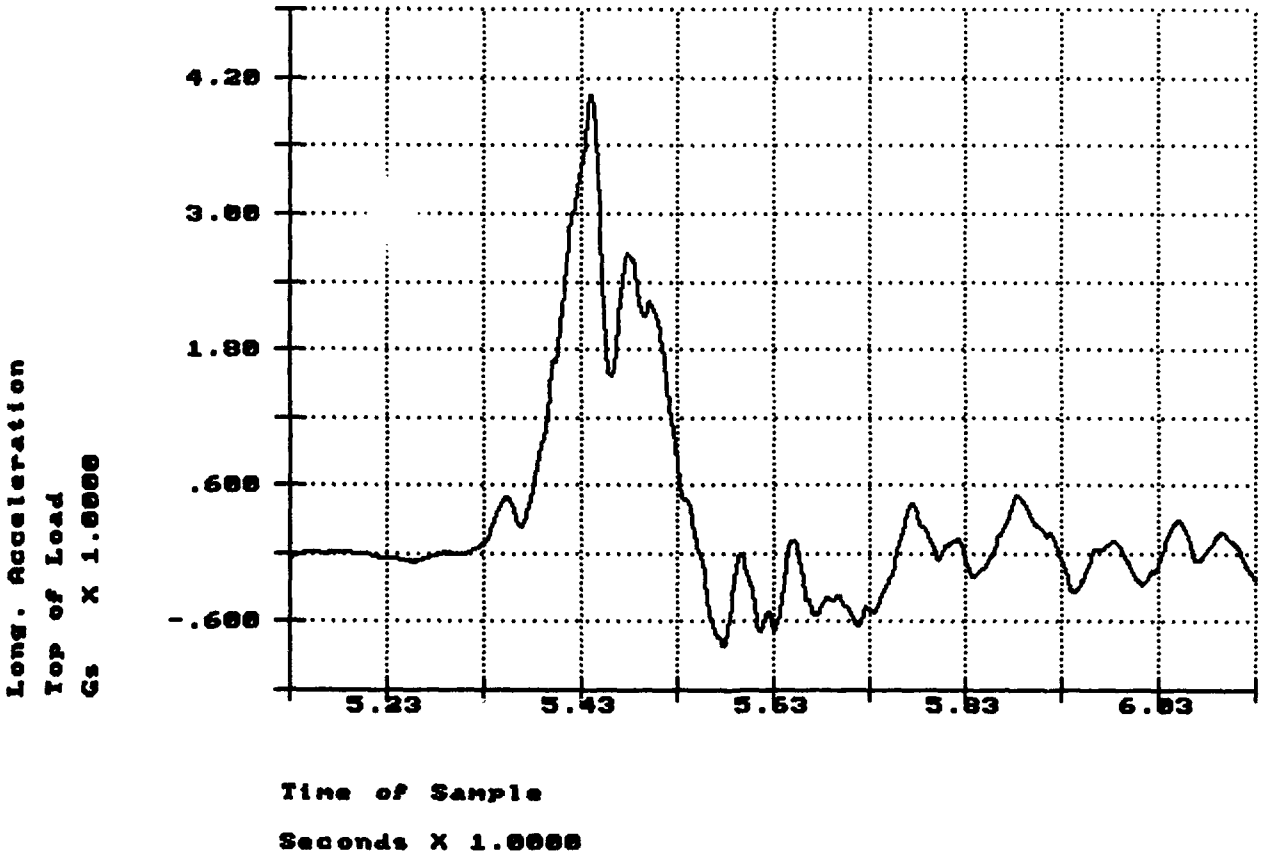
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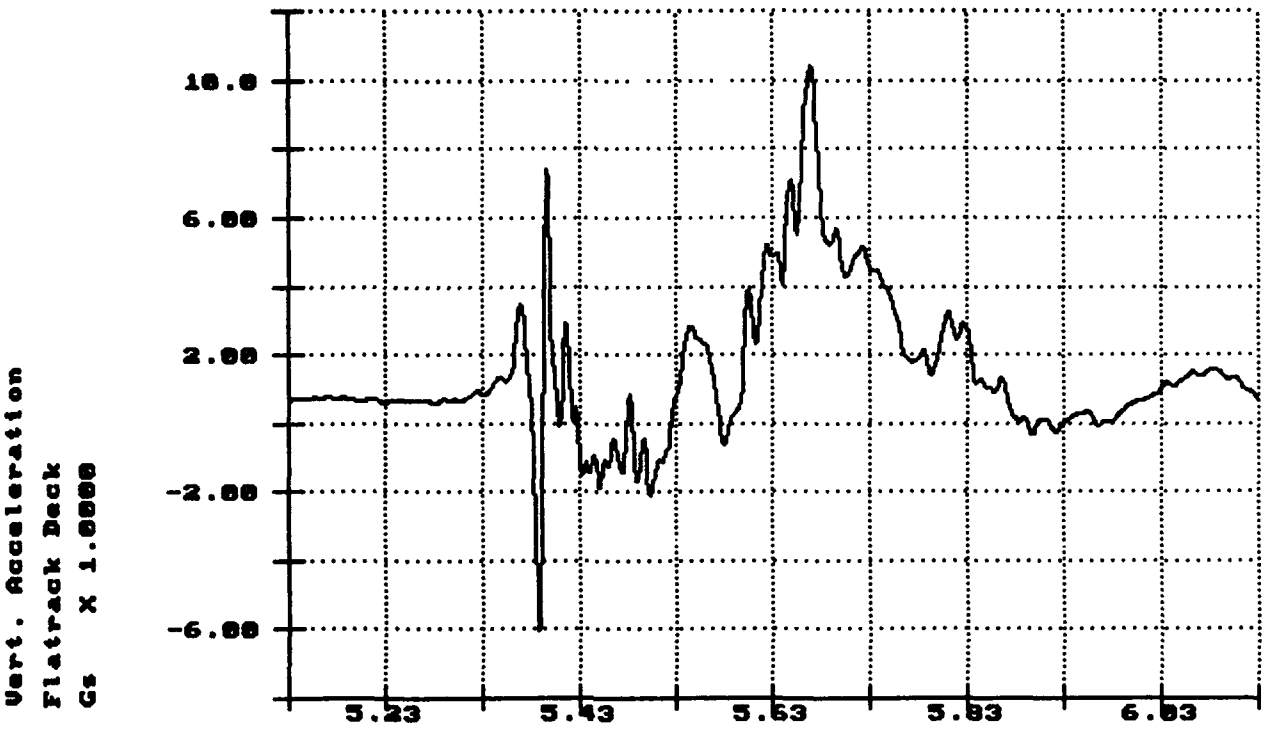
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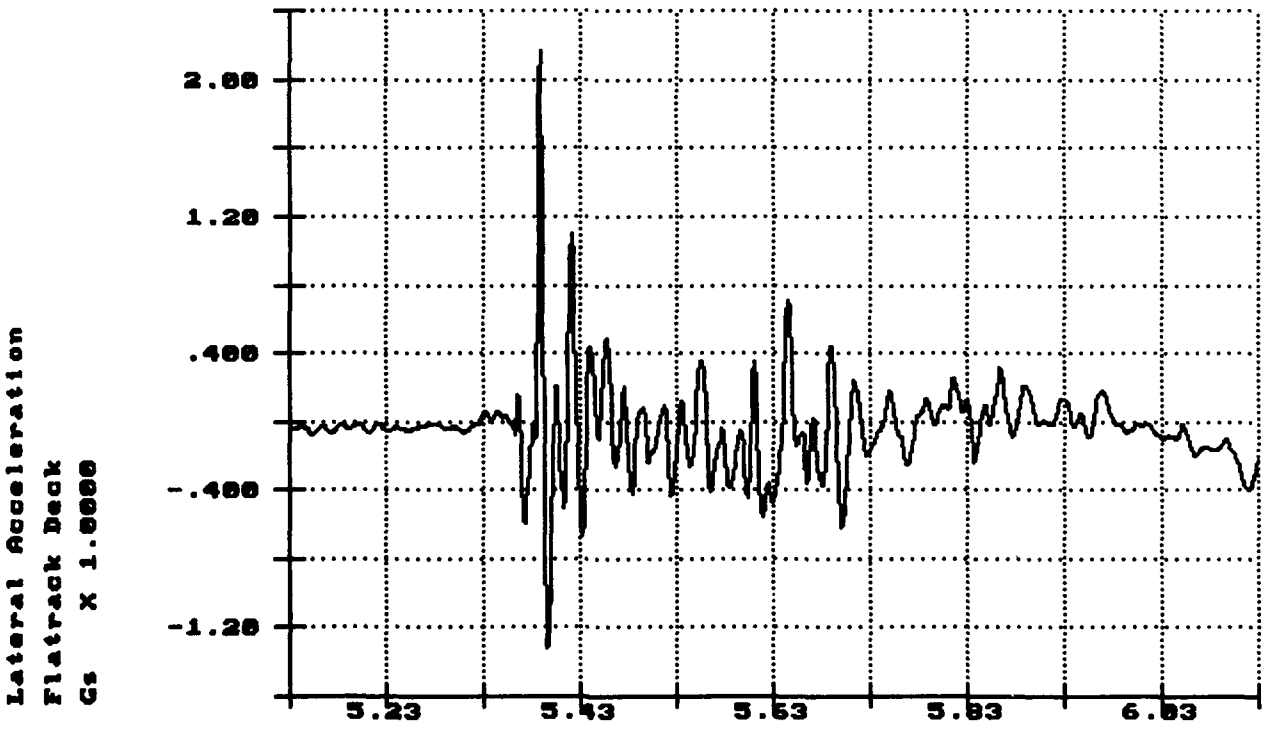
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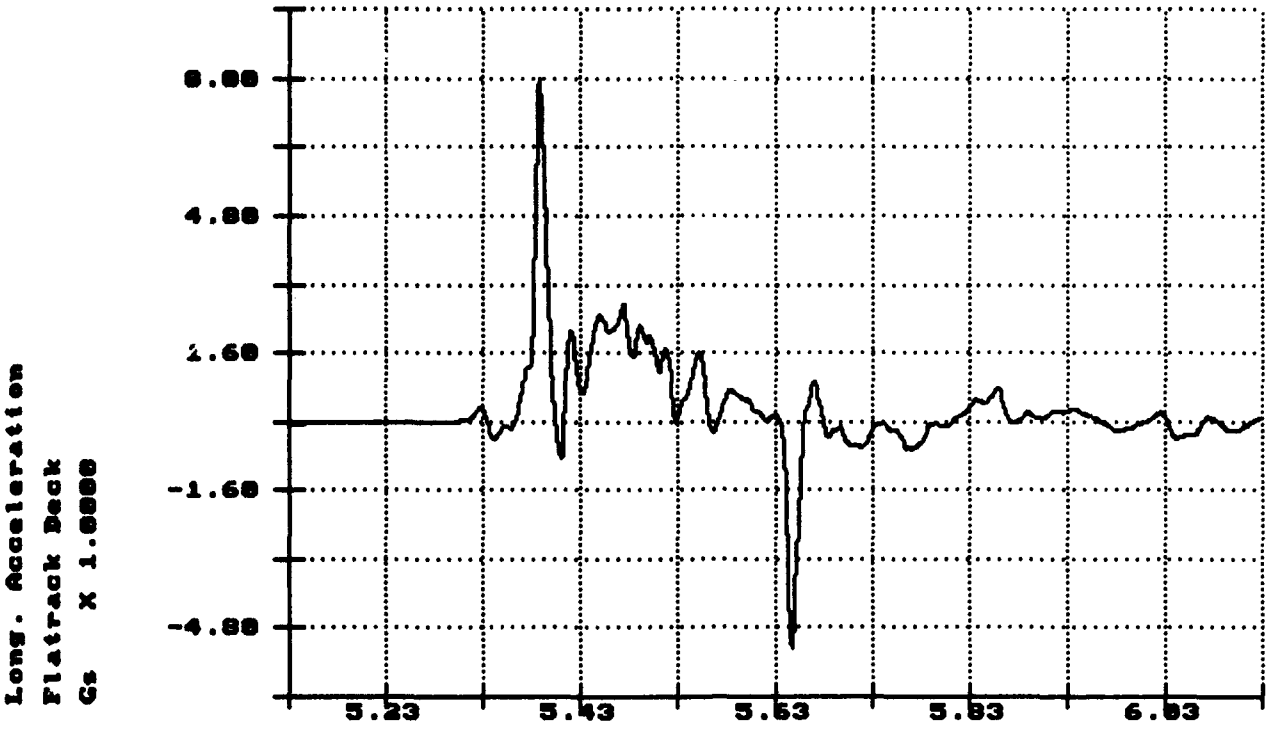
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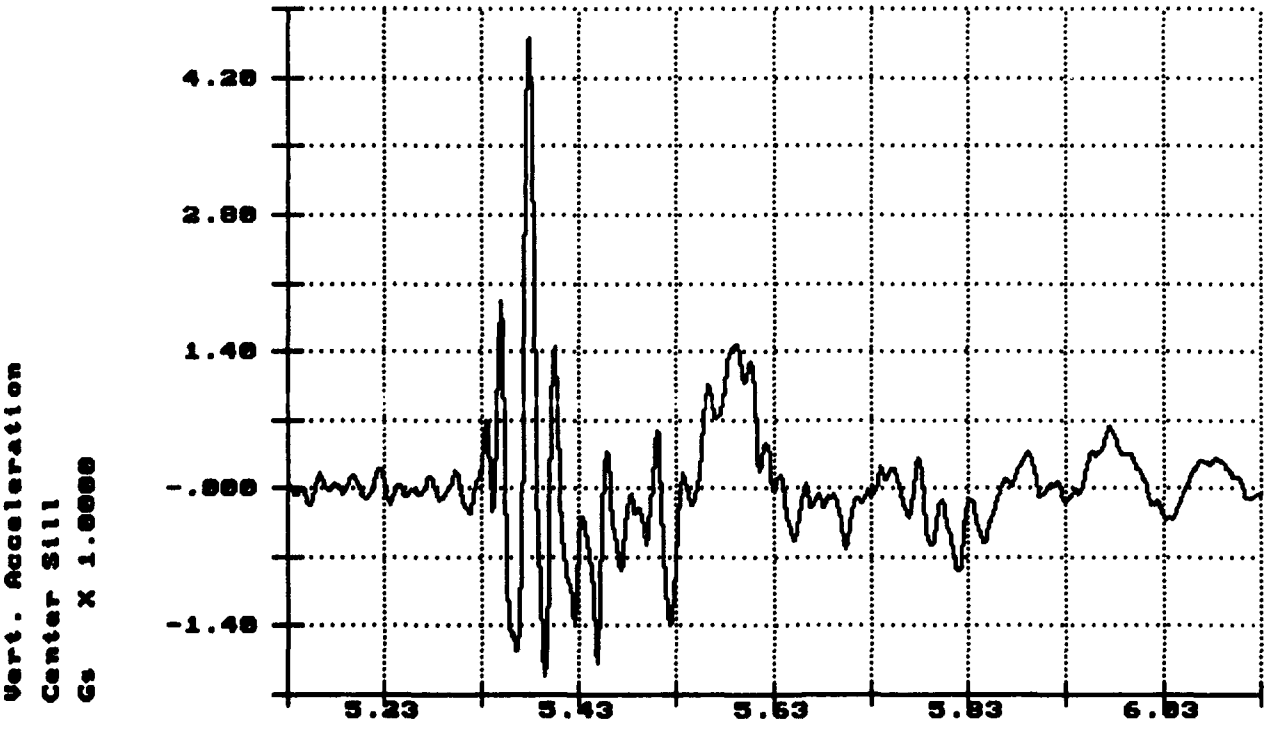
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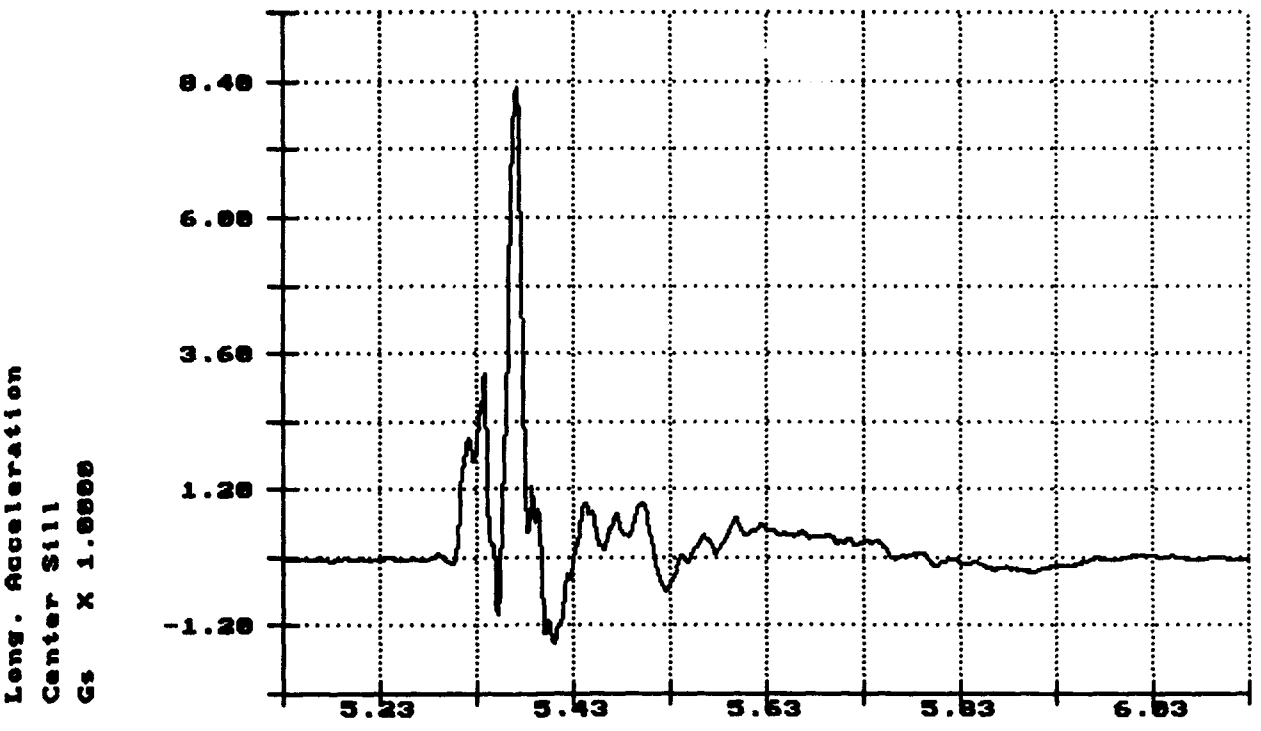
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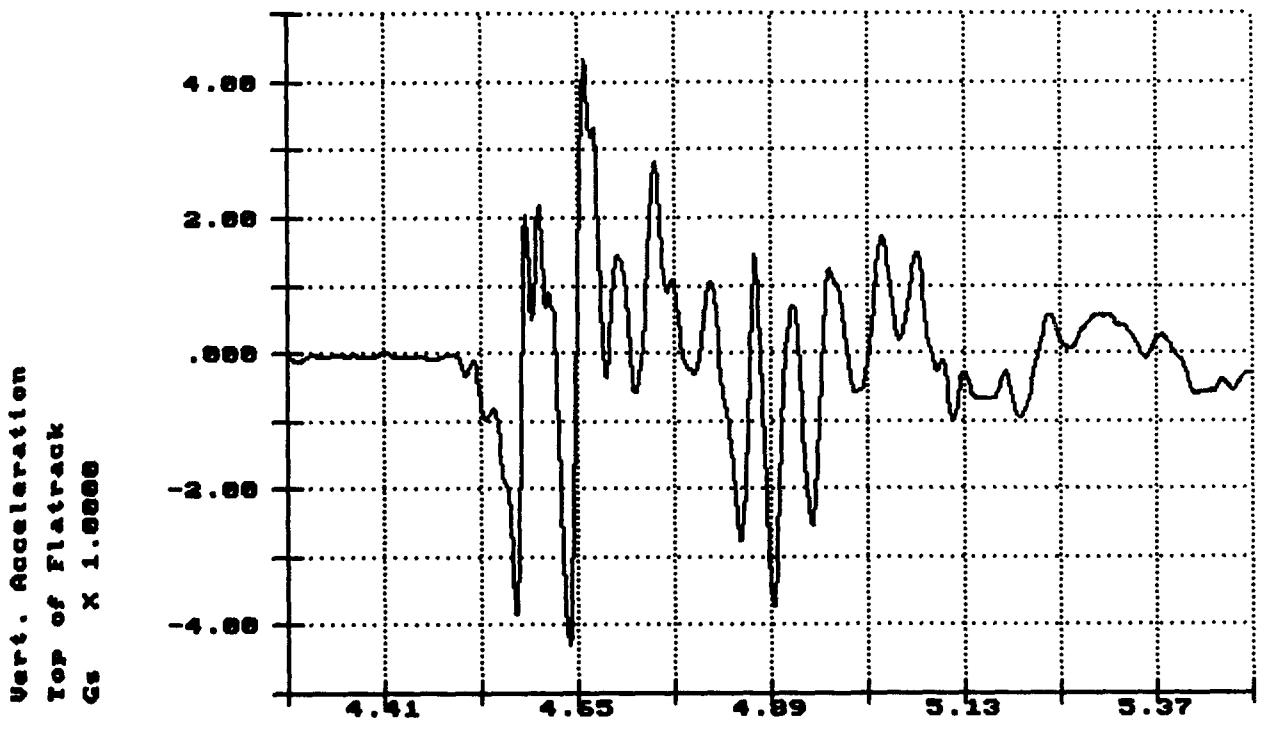
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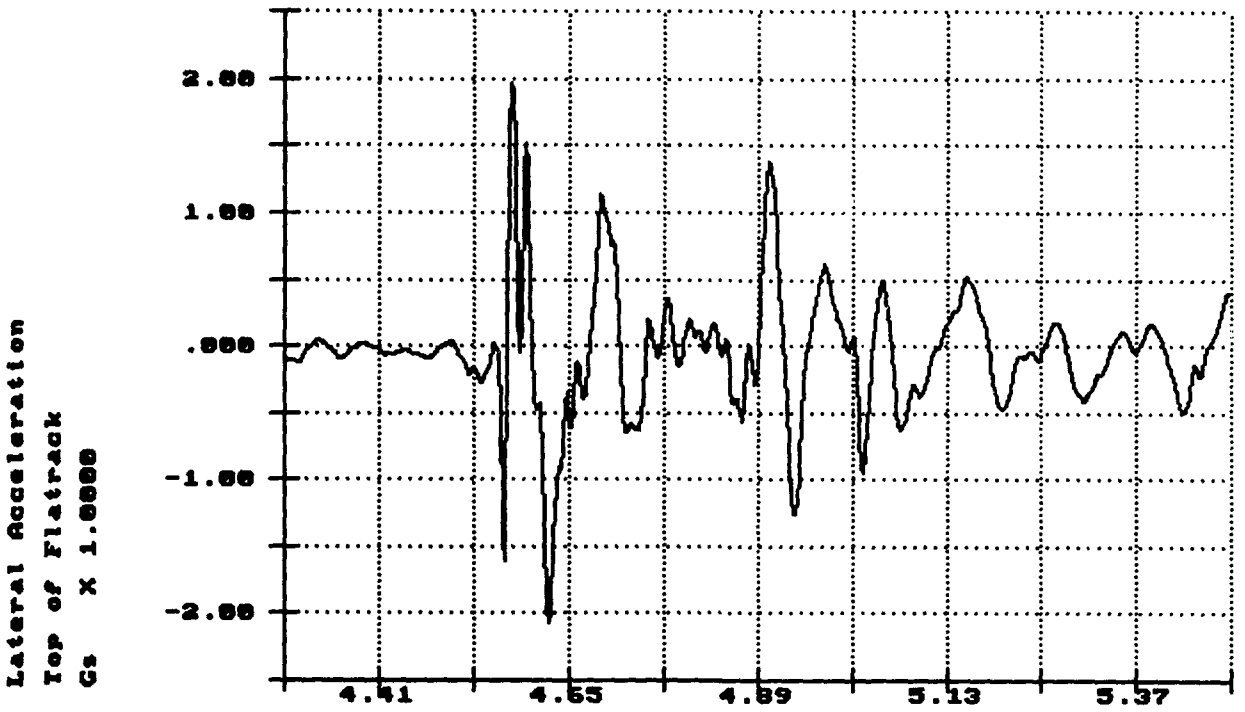
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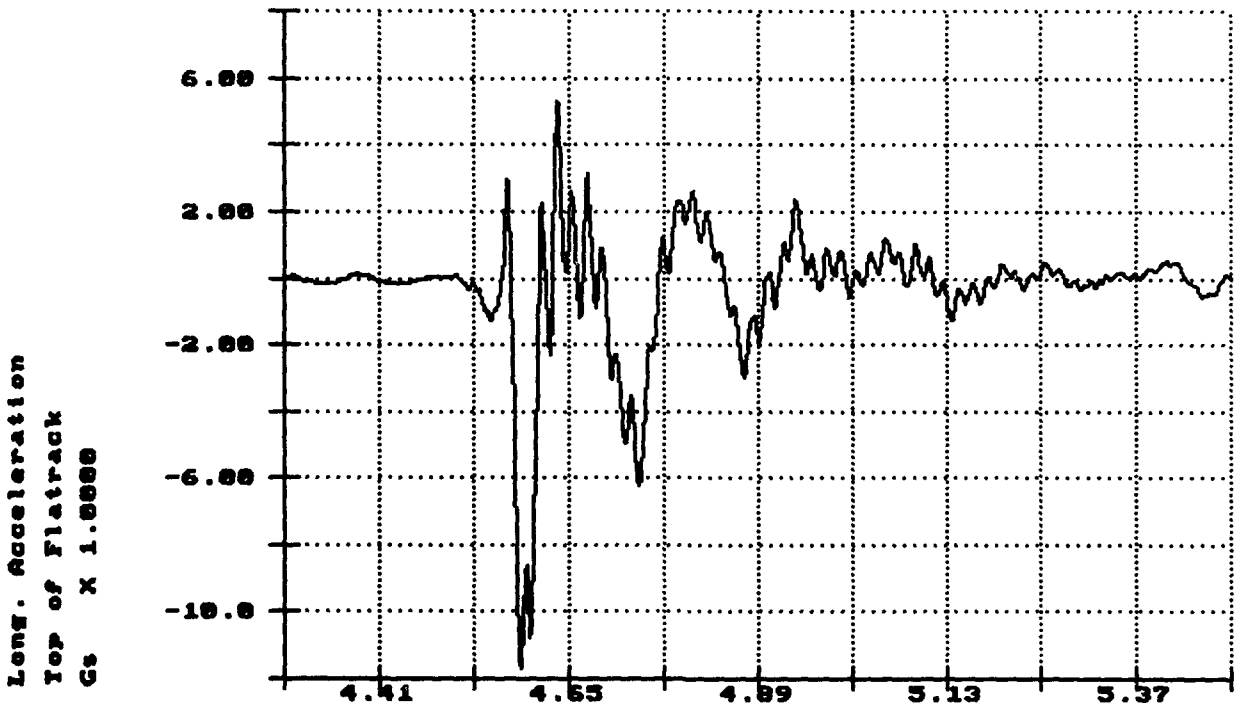
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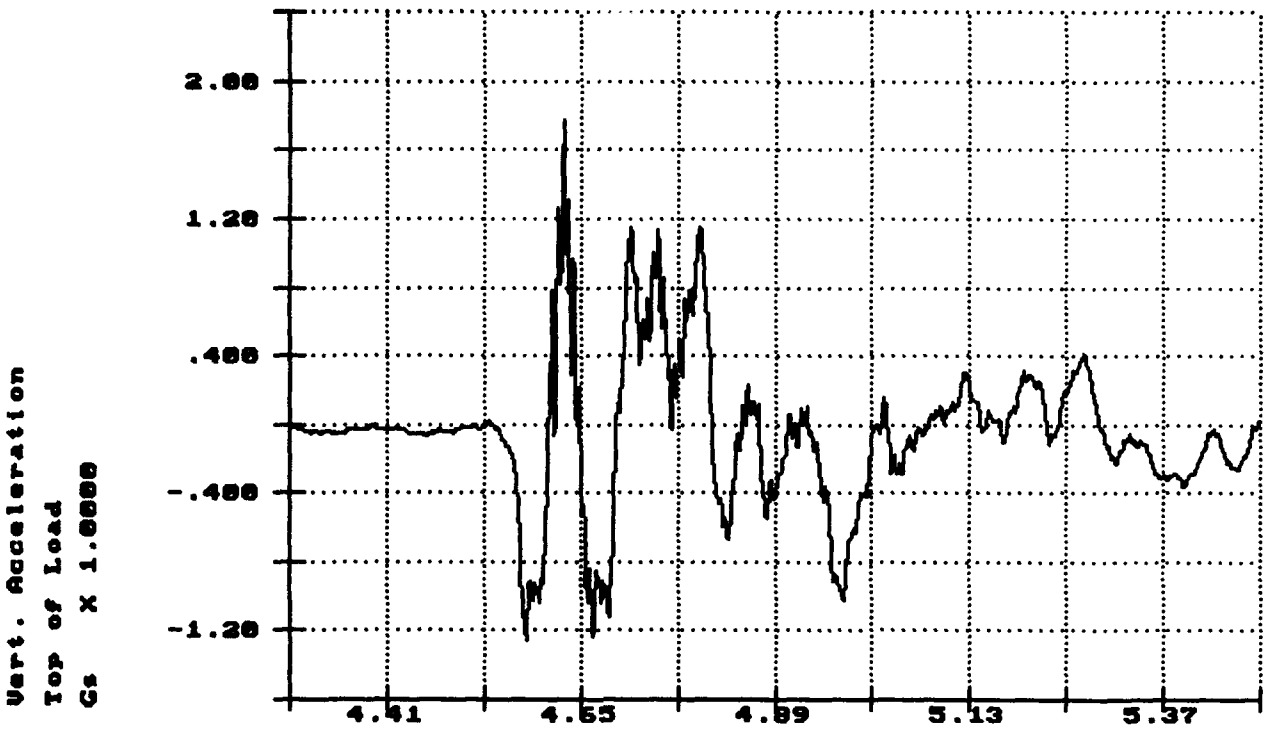
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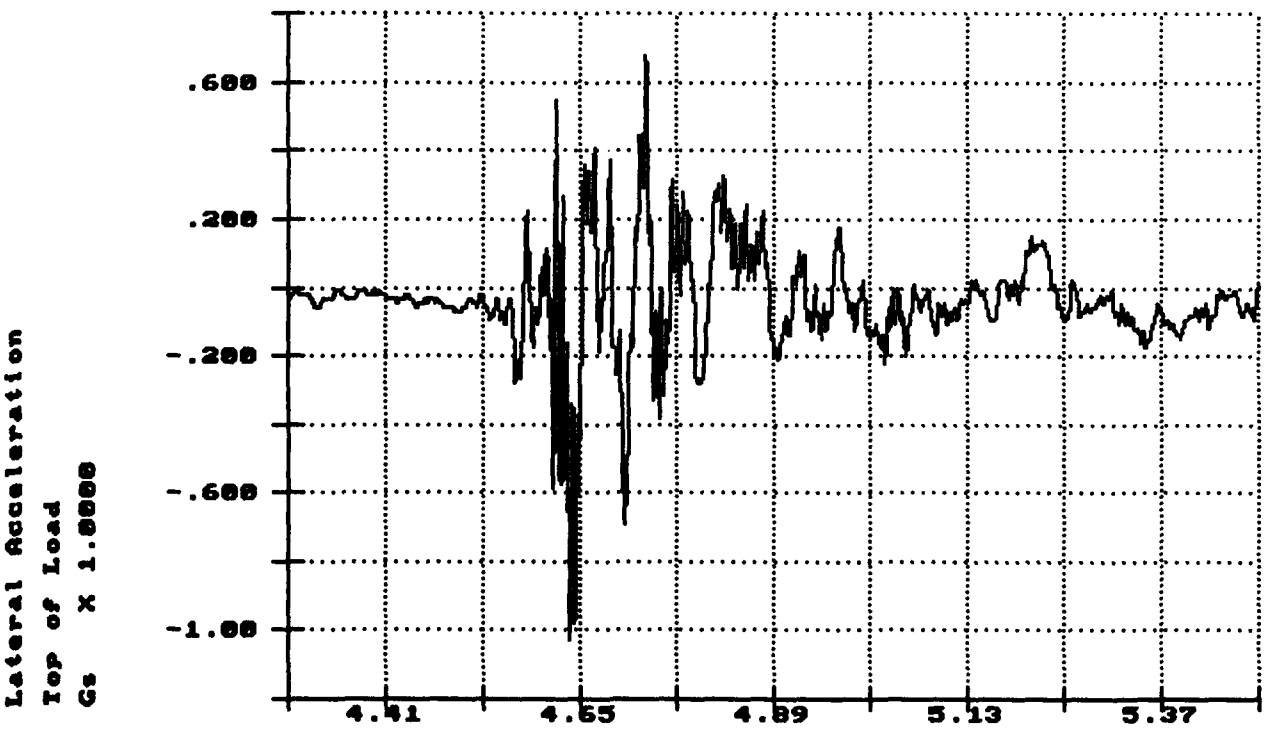
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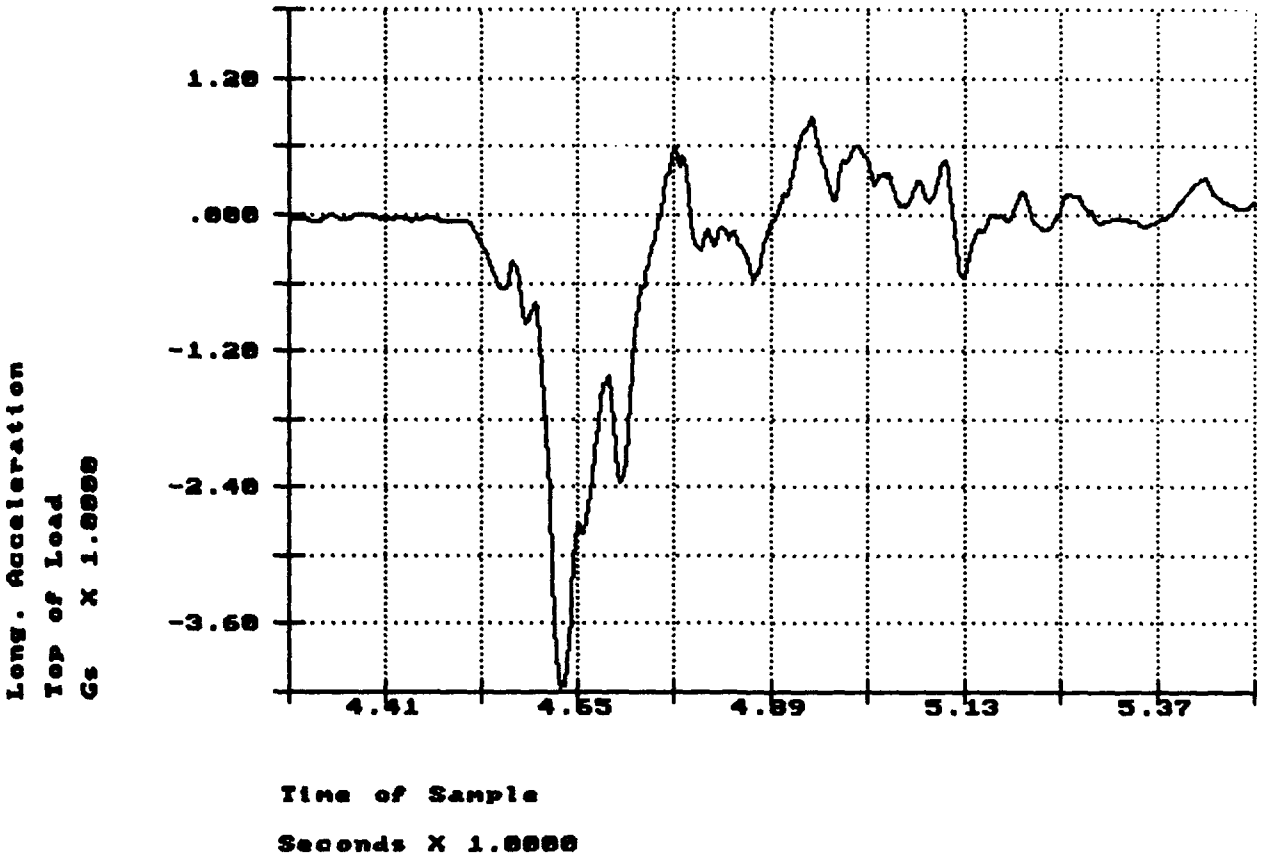
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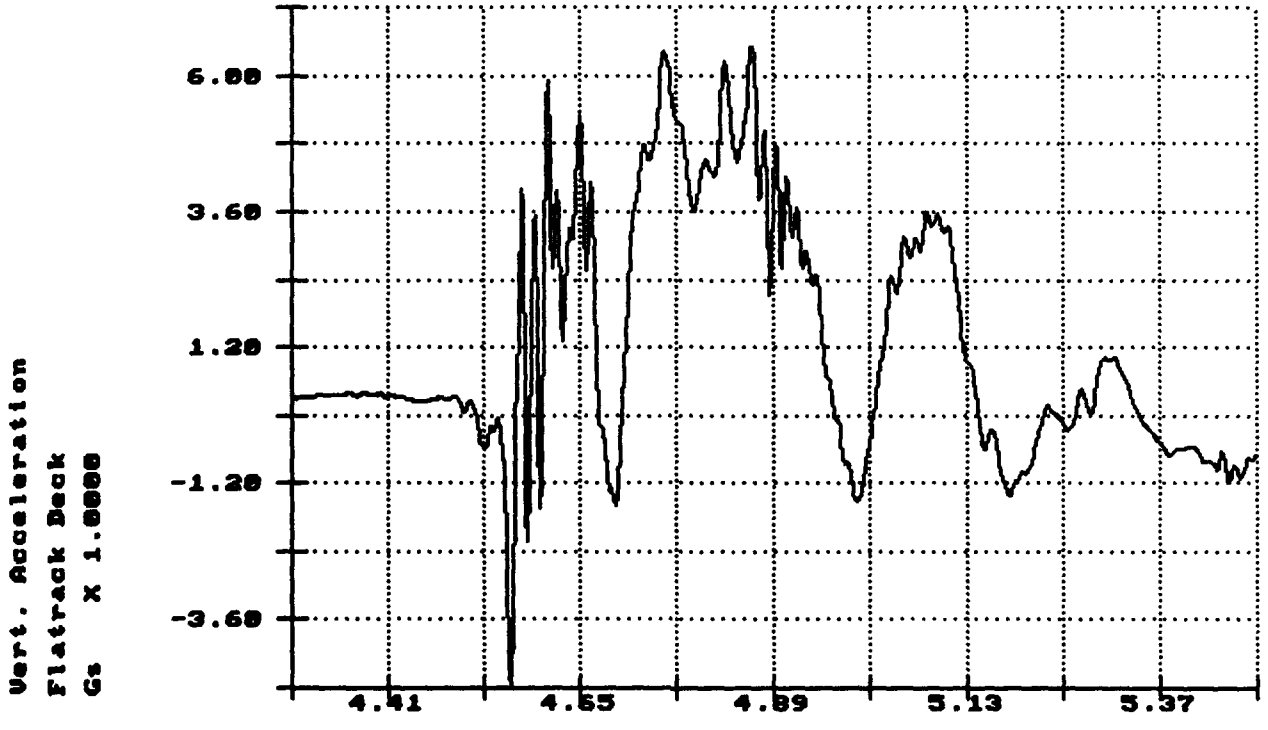
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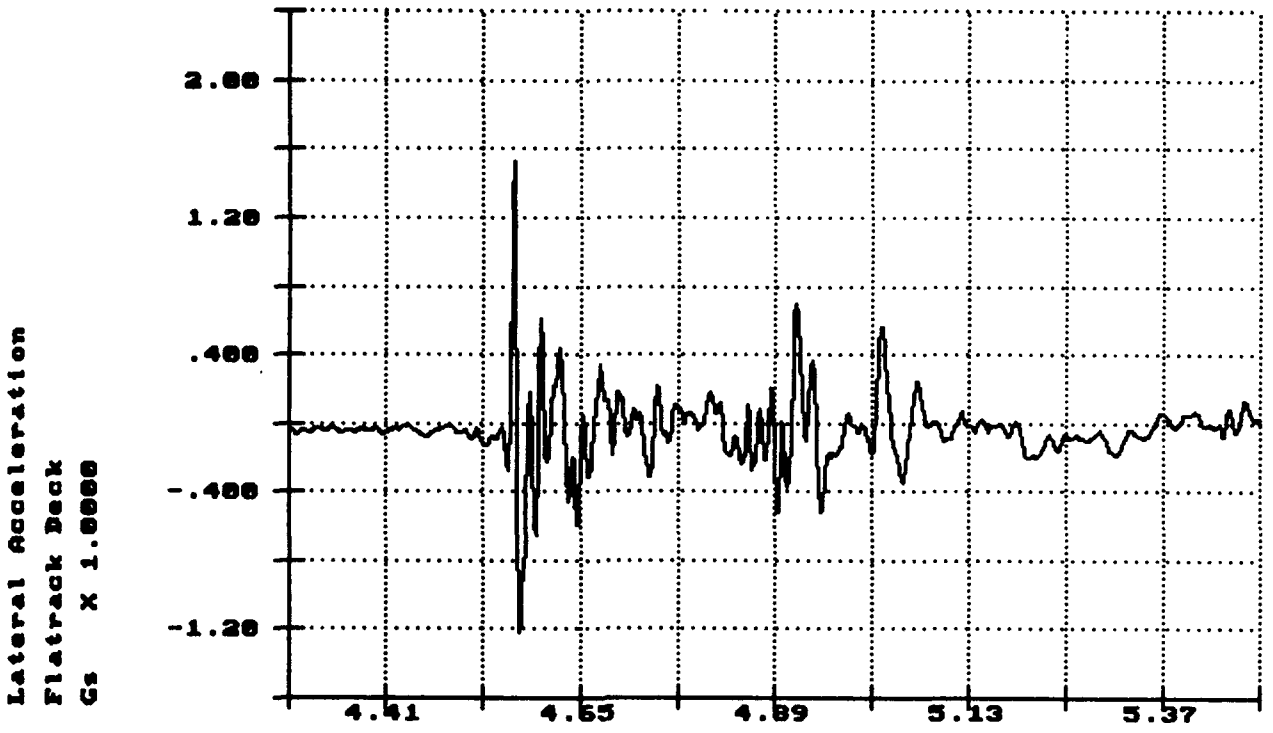
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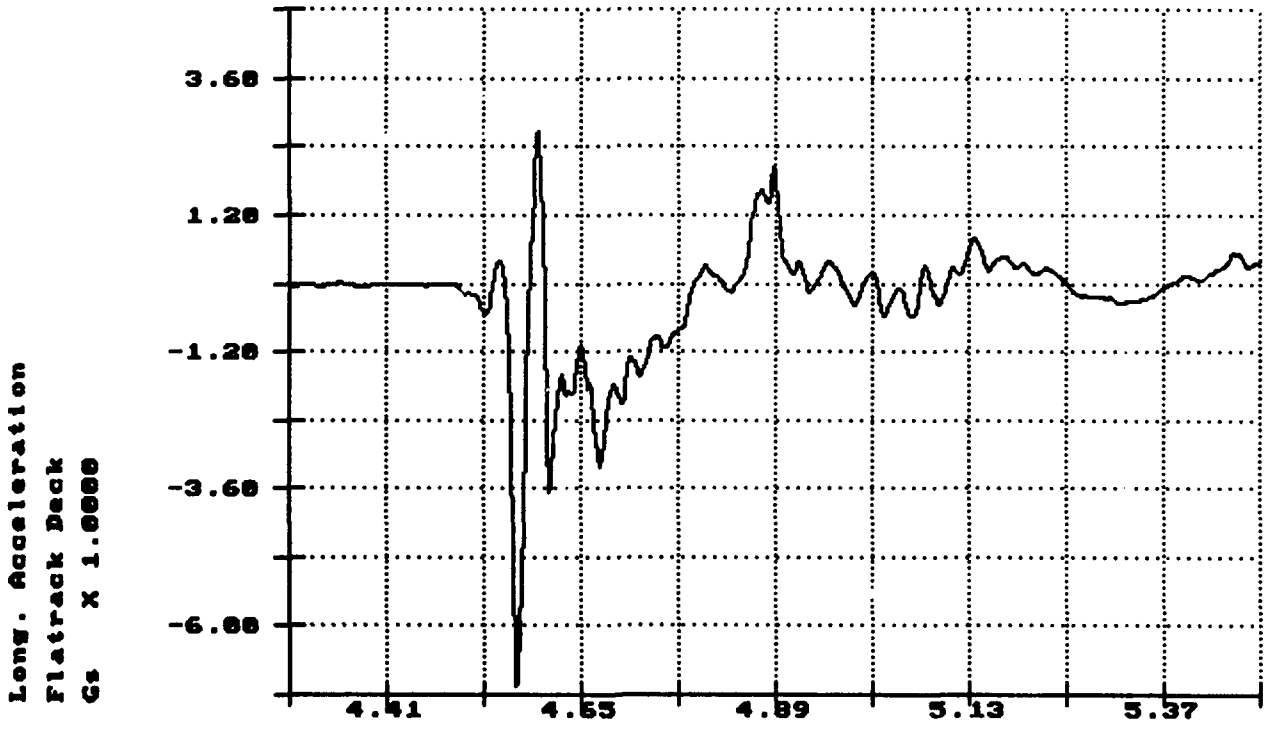
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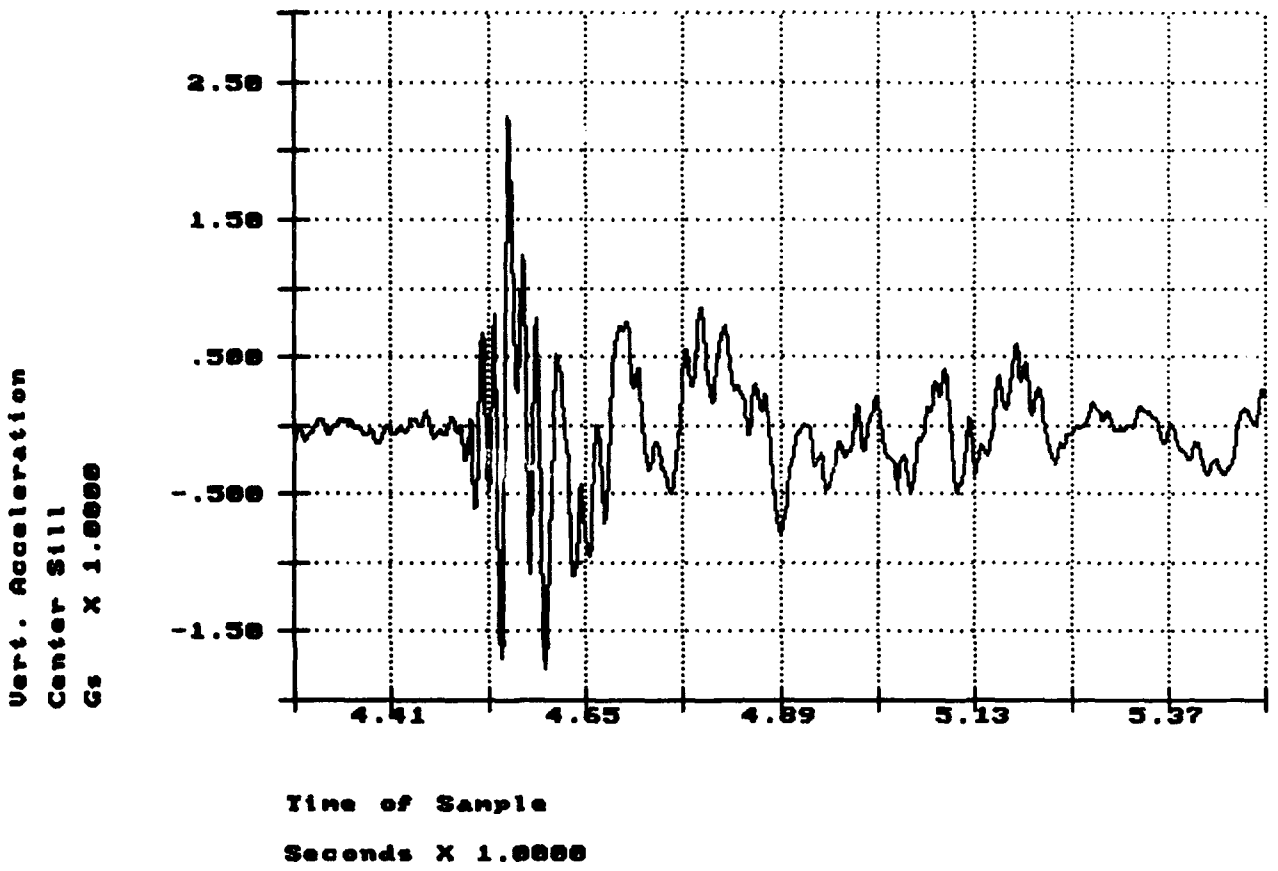
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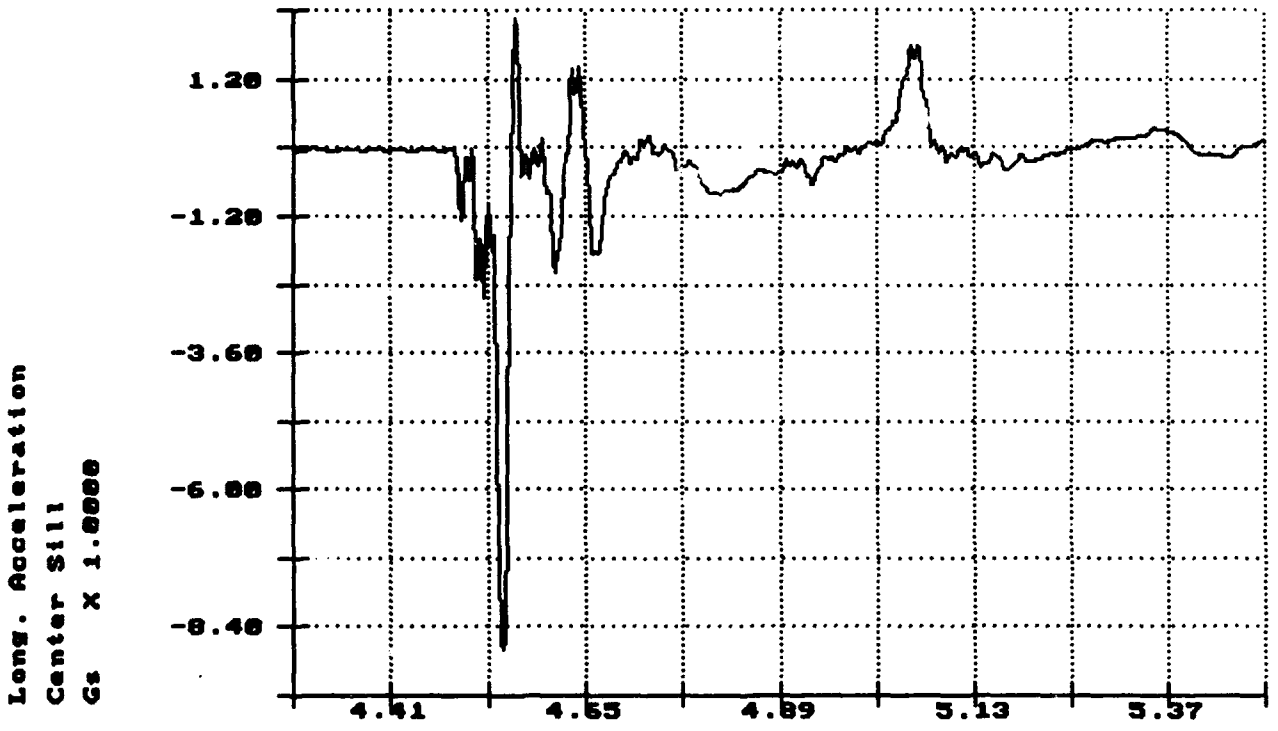
R.I. of PLS Flatrack, Impact 4: 8.43MPH Dec 09 10:34:13 1993



R.I. of PLS Flatrack, Impact 4: 8.43MPH Dec 09 10:34:13 1993



I. of PLS Flatrack, Impact 4: 8.43MPH Dec 09 10:34:13 1993



TEST NO. 16

RAIL IMPACT DATA

Test No.: 16 Date: 9 December 1993

Specimen Load: PLS trailer with an EPF loaded with propelling charge containers on wooden pallets.

Flatcar No.: EJ&E 6099	Lt. Wt.: 56,200
PLS Trailer	Wt.: 13,240
EPF No. 1	Wt.: 7,500
Lading, 155MM Propelling Charge Containers	Wt.: 14,128
	Total Specimen Wt.: 91,068
	Buffer Car (five cars) Wt: 250,000

Impact	End Struck	Velocity	Remarks
1	Forward	4.34	No load movement.
2	Forward	6.30	The EPF moved 1-inch from rear stops on trailer.
3	Forward	8.62	The load shifted 2 inches toward impact end of the EPF.
4	Rear	8.43	The load shifted 2 inches toward the rear of EPF. The EPF moved back to the stops on the trailer.

TEST NO. 17

RAIL IMPACT DATA

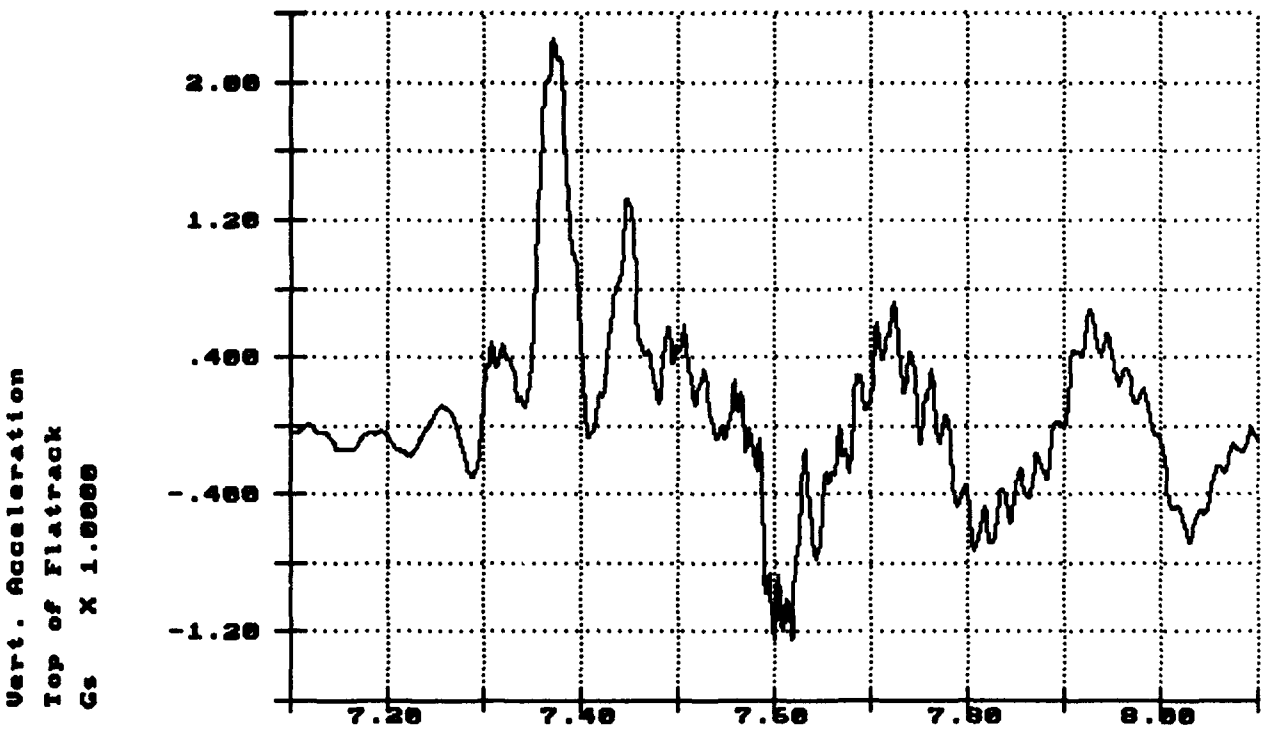
Test No.: 17 Date: 13 December 1993

Specimen Load: PLS truck with an EPF loaded with propelling charge containers on wooden pallets.

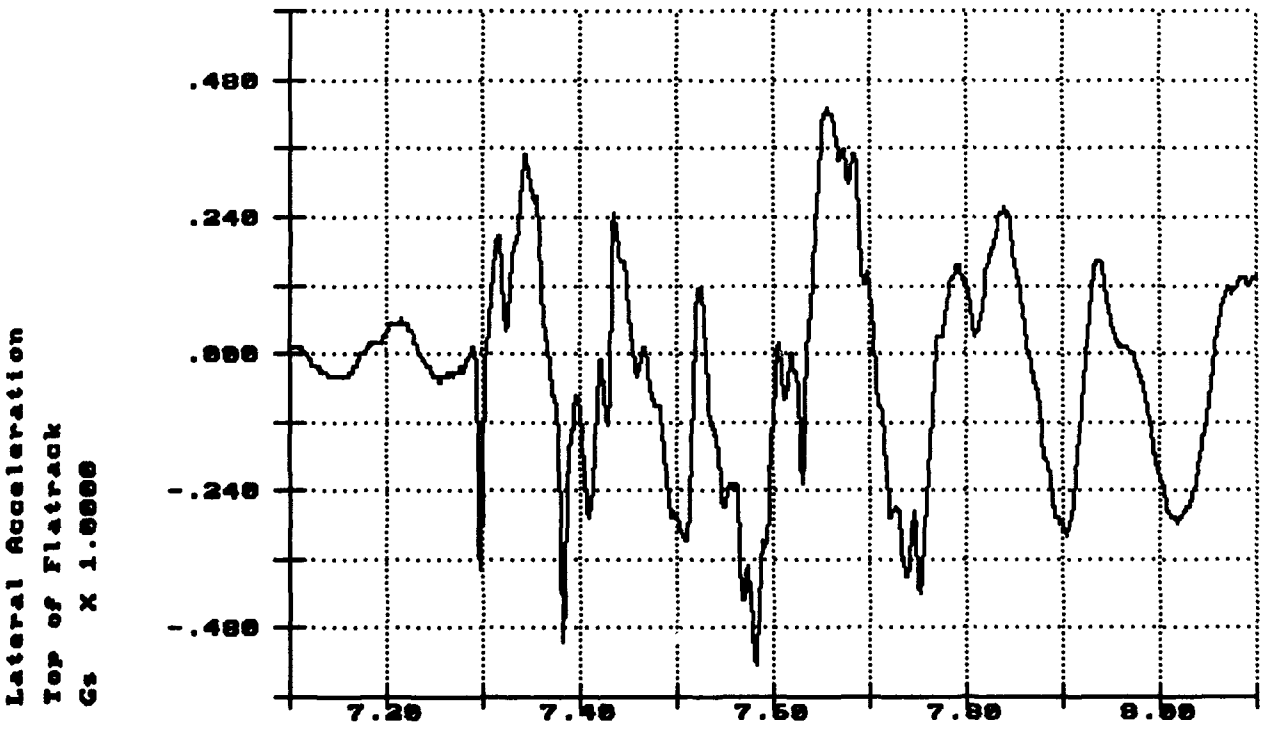
Flatcar No.: EJ&E 6001	Lt. Wt.:	57,200
PLS Truck	Wt.:	54,750
EPF No. 1	Wt.:	7,500
Lading, 155MM Propelling Charge Containers on Wooden Pallets	Wt.:	14,128
	Total Specimen Wt.:	133,578
	Buffer Car (five cars) Wt:	250,000

Impact	End Struck	Velocity	Remarks
1	Rear	4.55	No load movement.
2	Rear	6.41	2-inch gap between the load and the EPF front end wall.
3	Rear	8.43	No change in gap between the load and the front end wall.
4	Forward	8.82	Longest cables on rear of PLS truck loosened after impact. No gap at the forward end wall and load. The load shifted forward and there was a 2-inch gap between the rear end wall and the pallets.

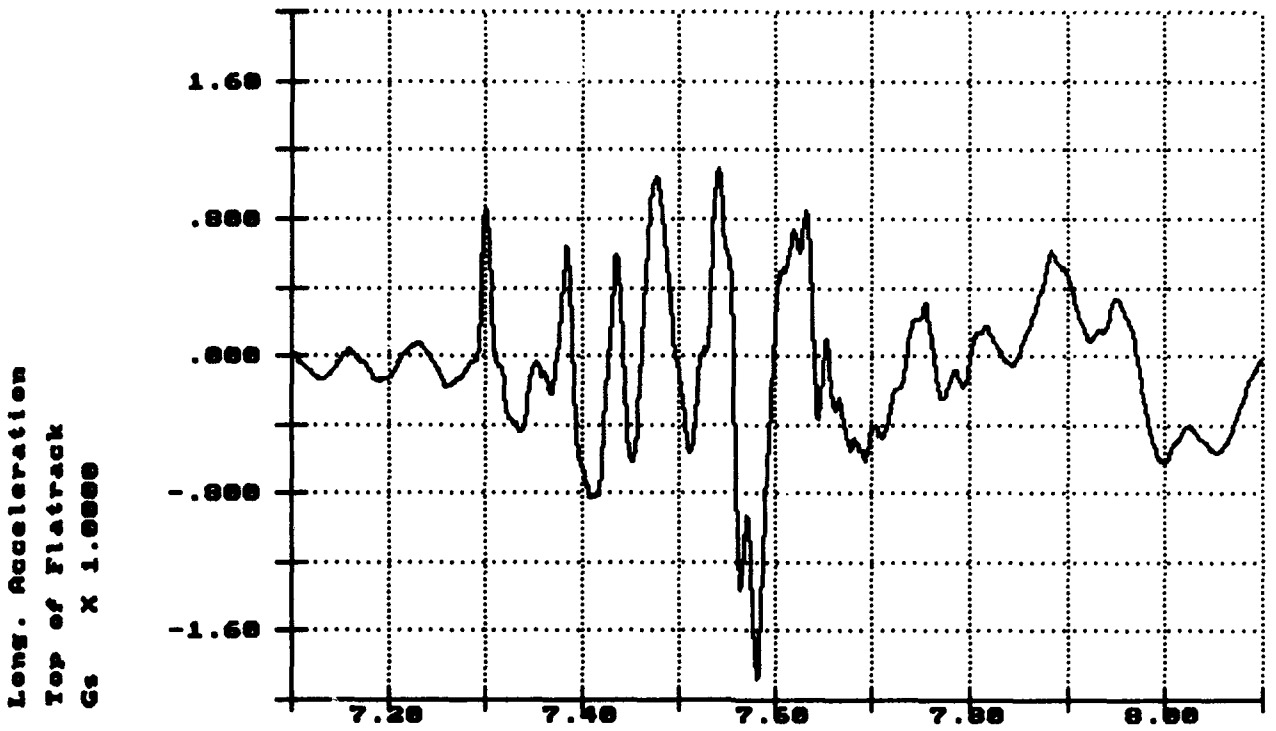
R.I. of PLS Truck, Impact 1: 4.29MPH Dec 13 09:59:52 1993



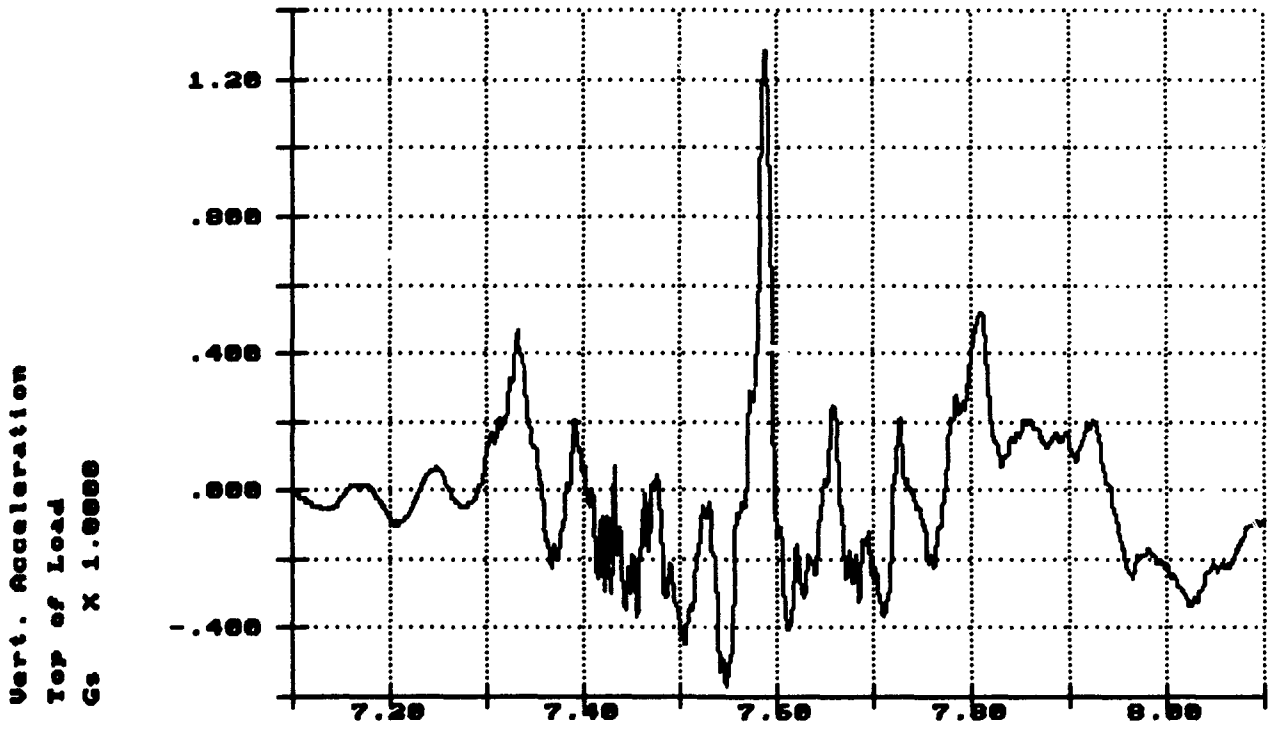
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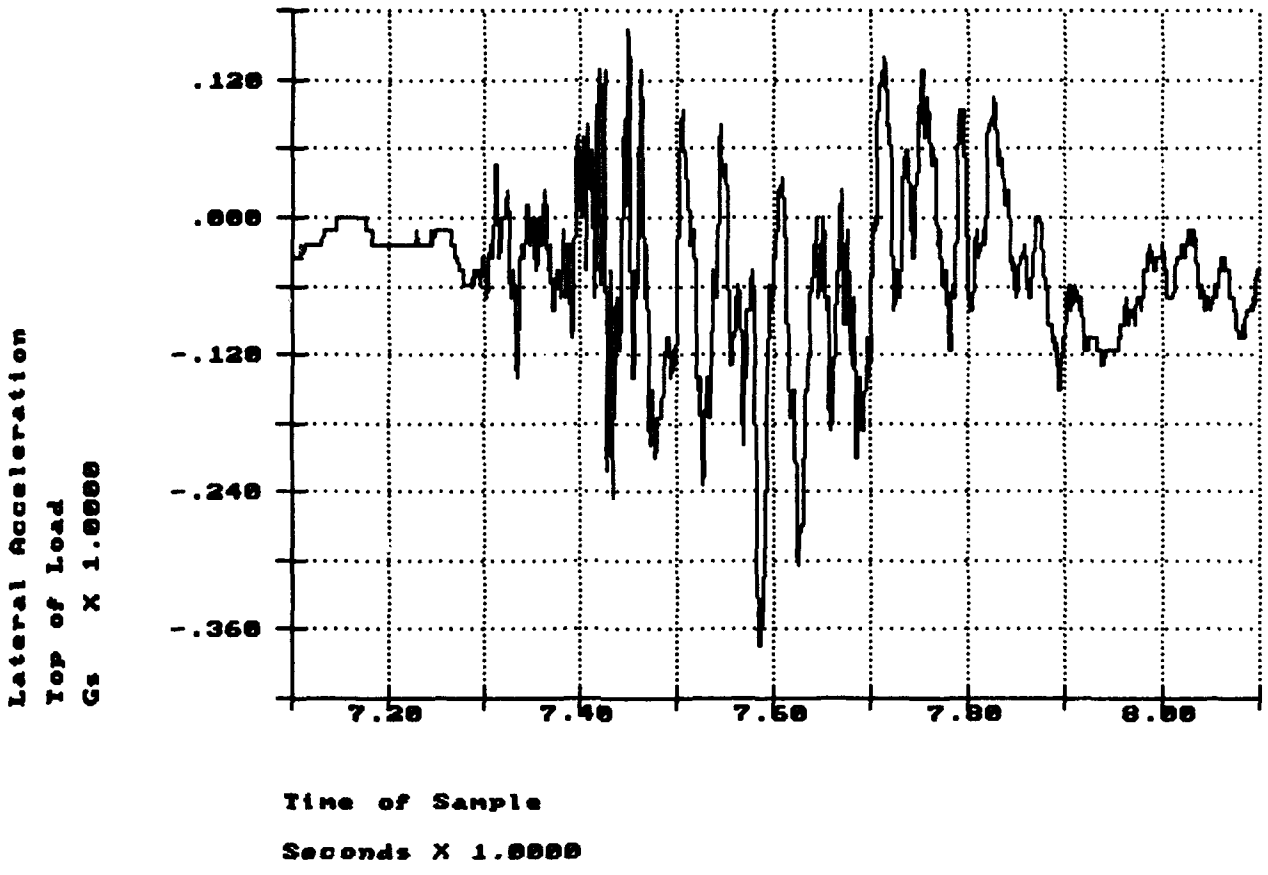
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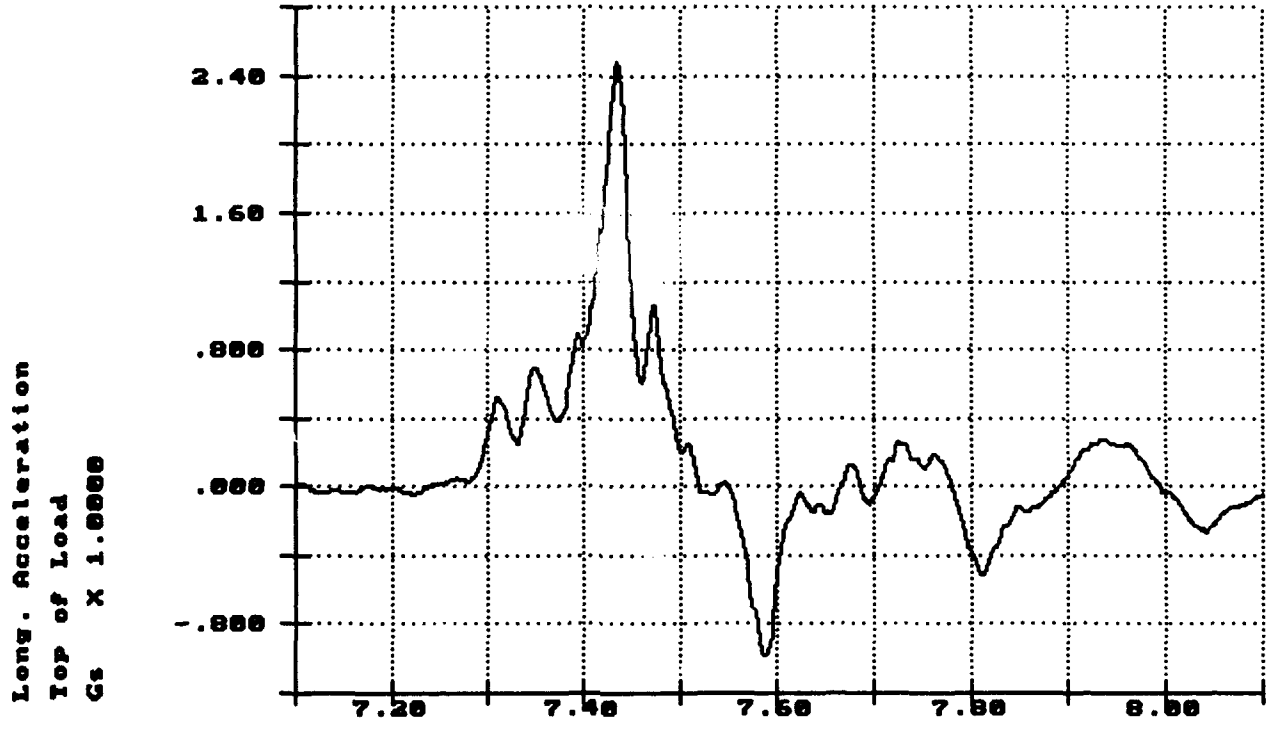
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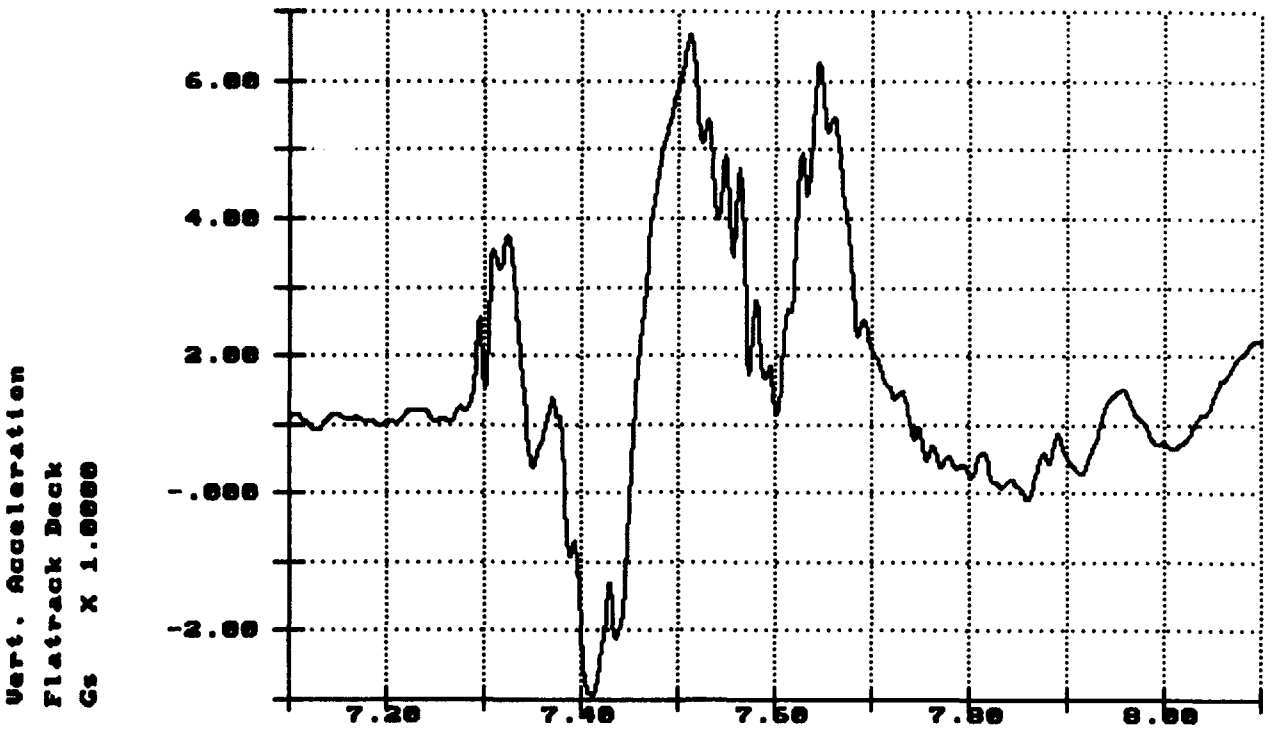
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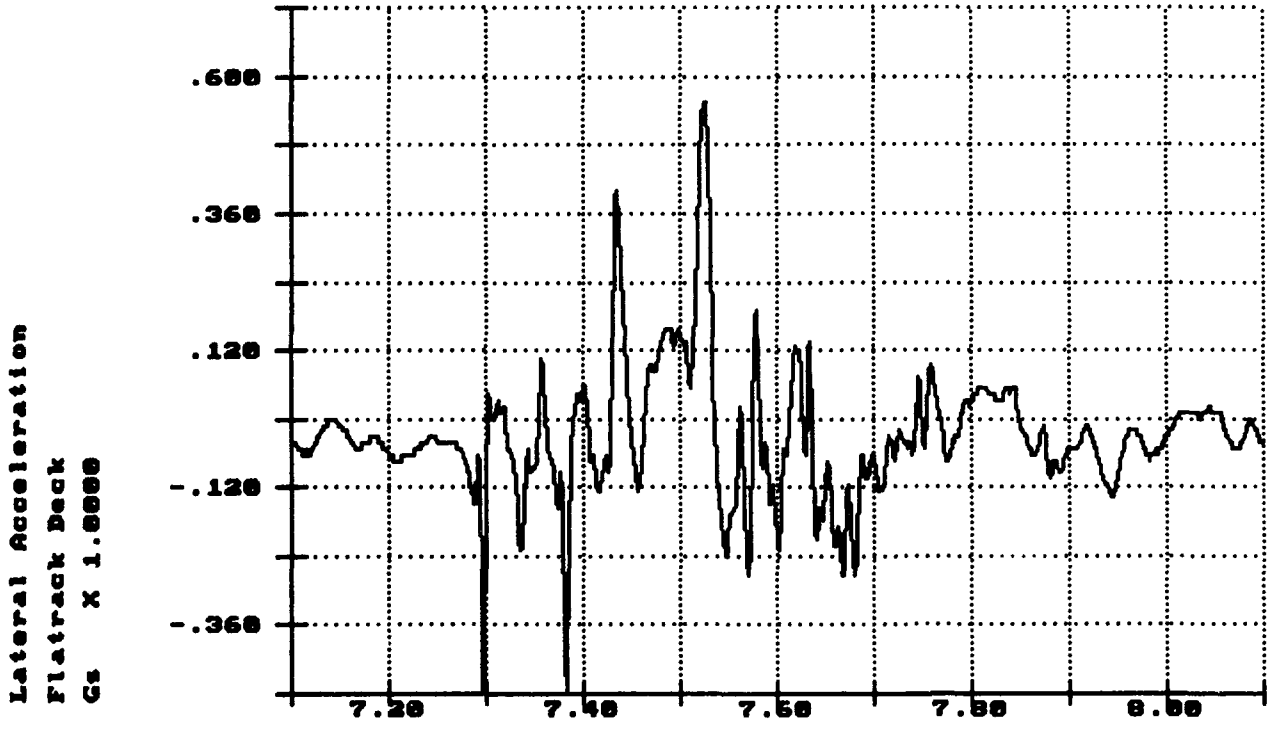
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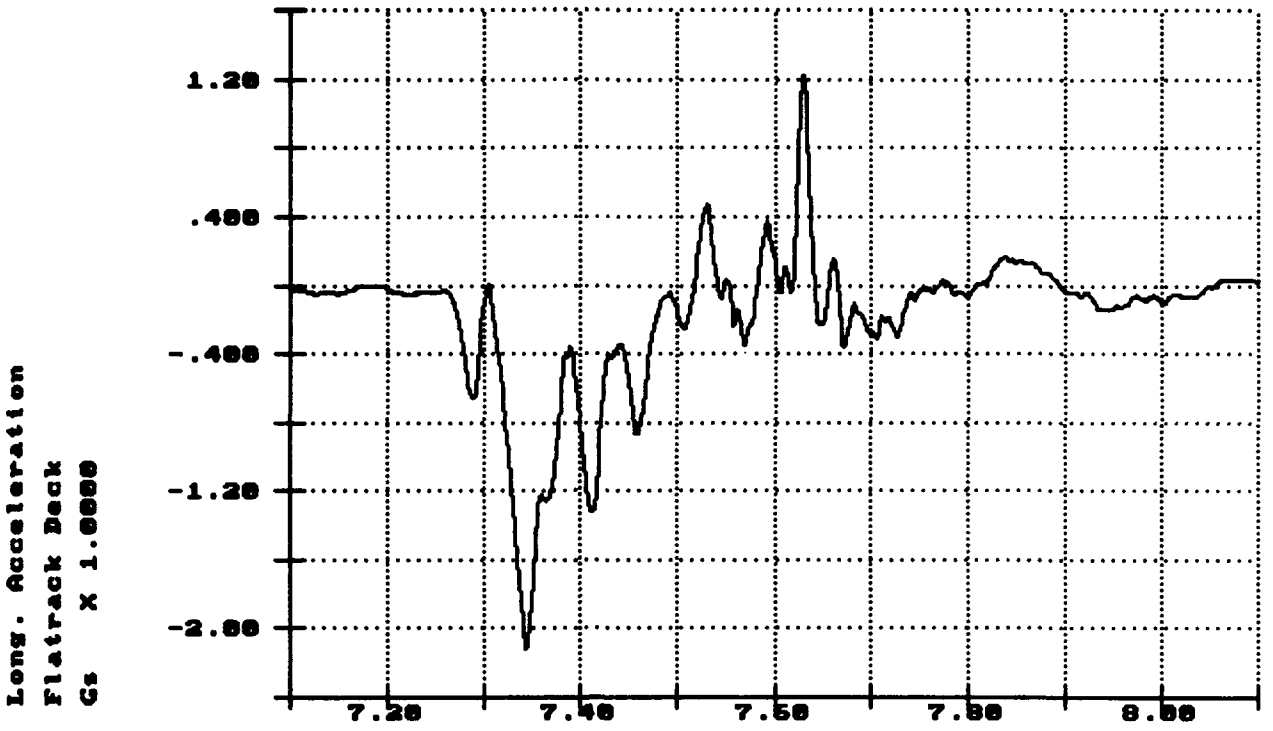
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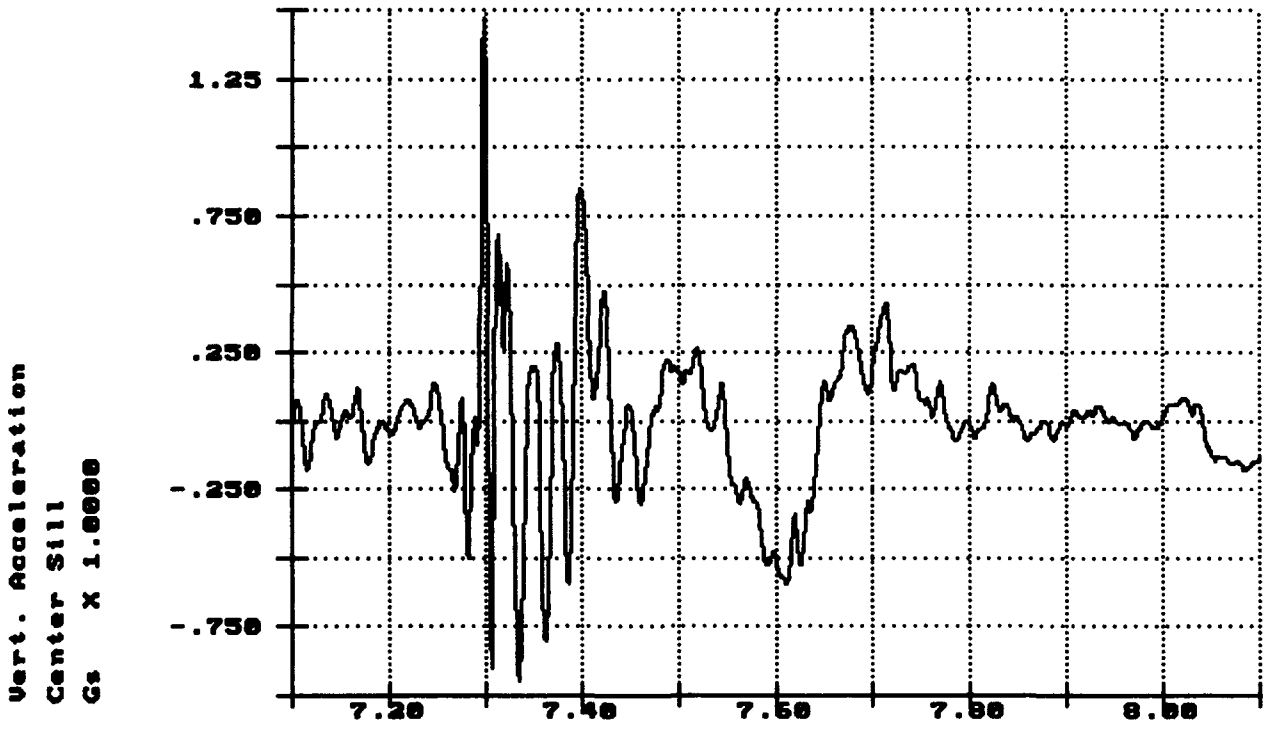
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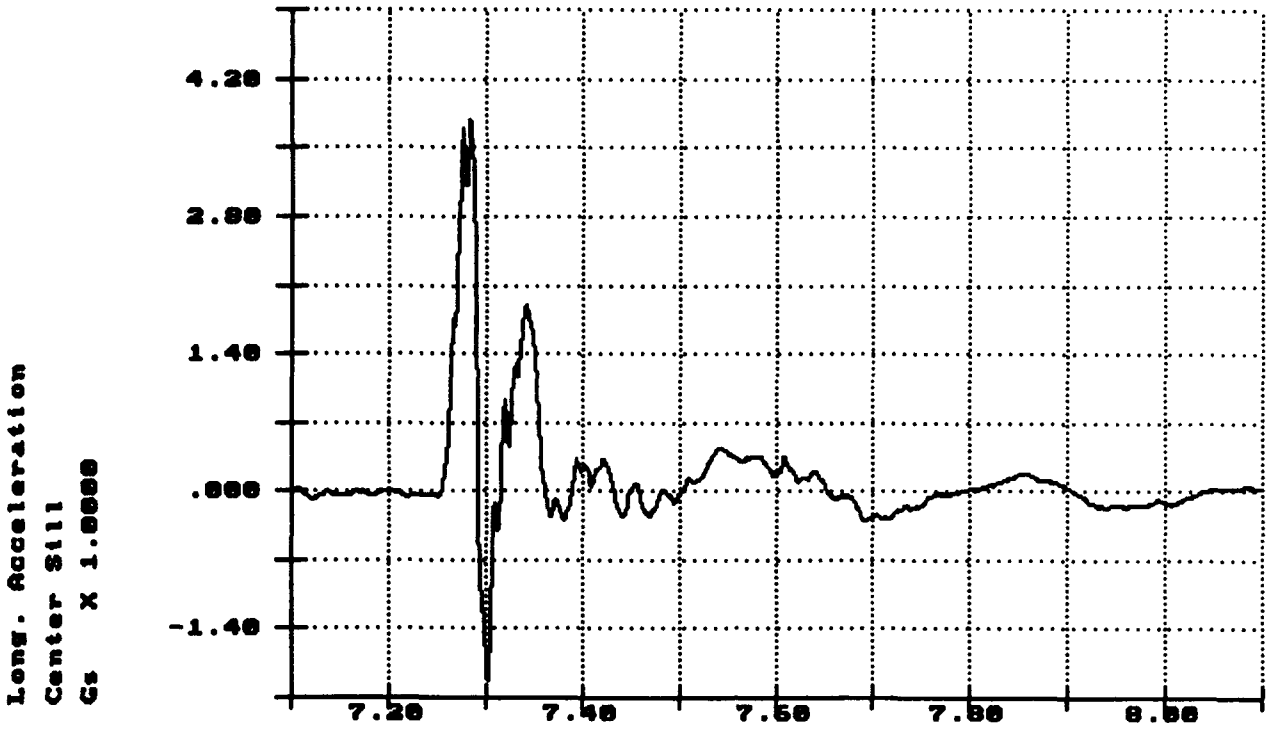
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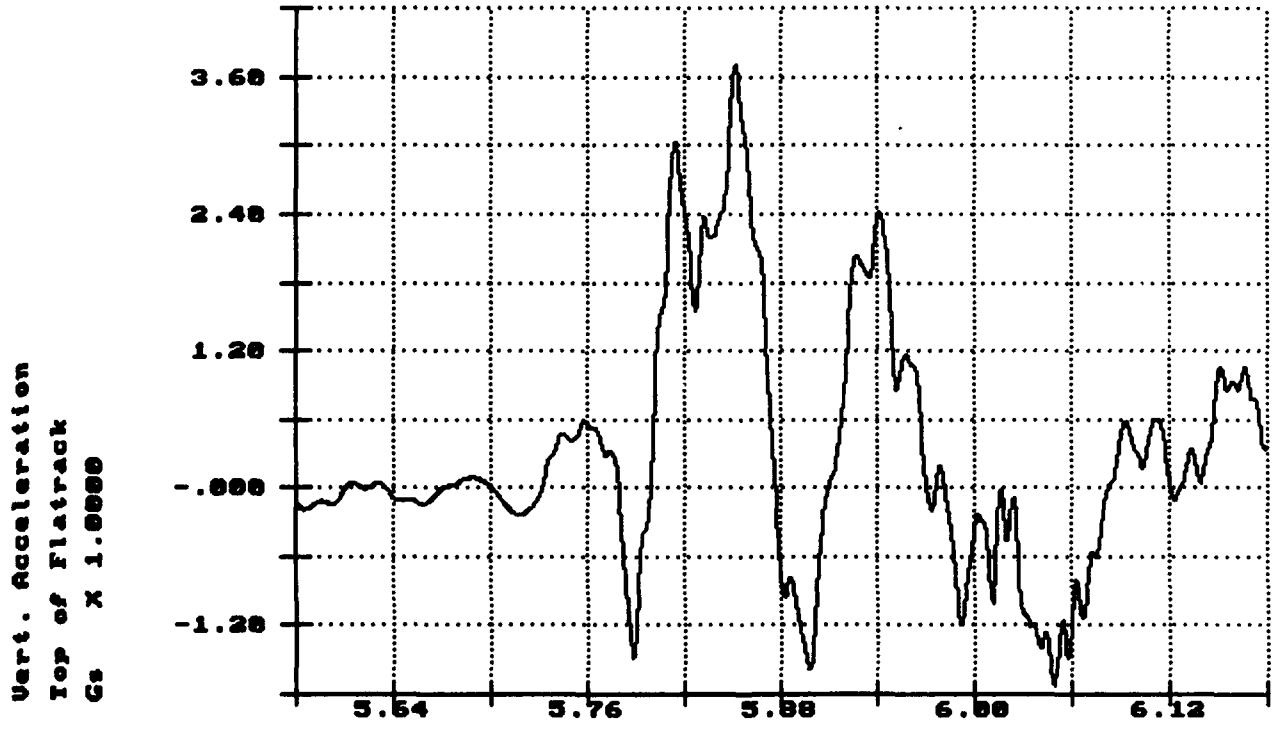
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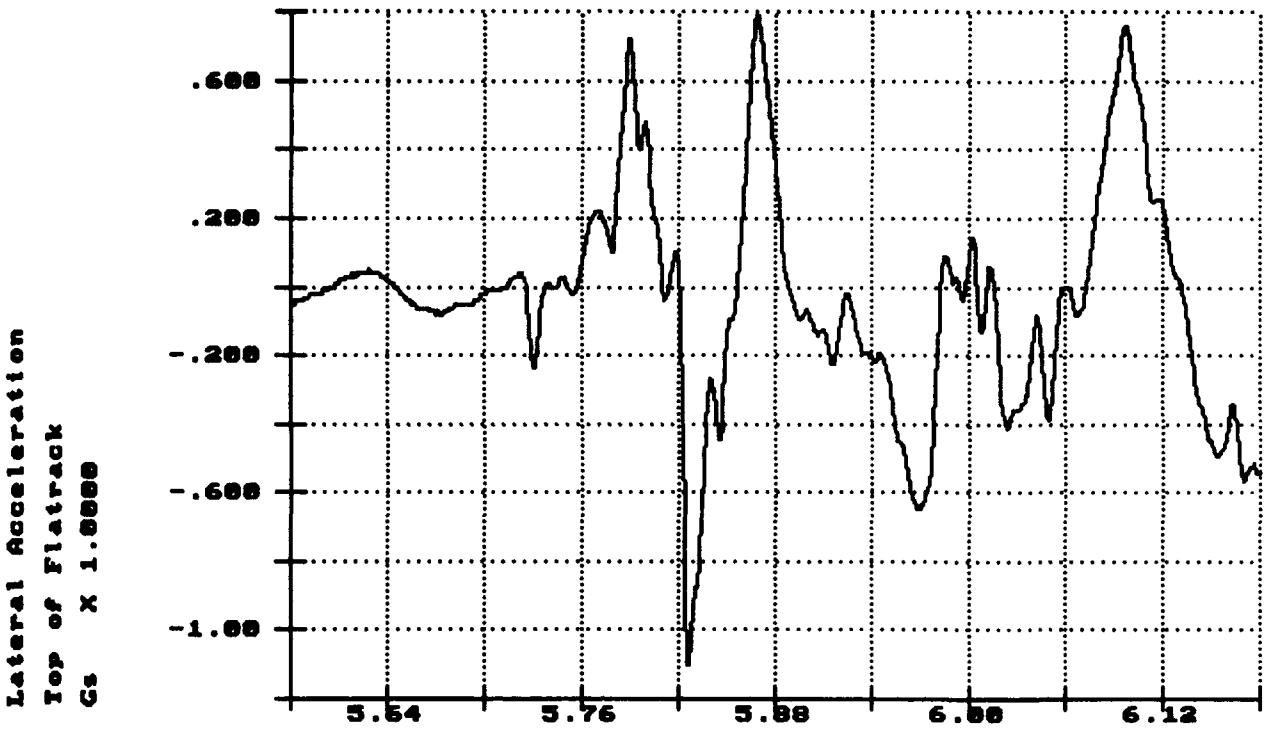
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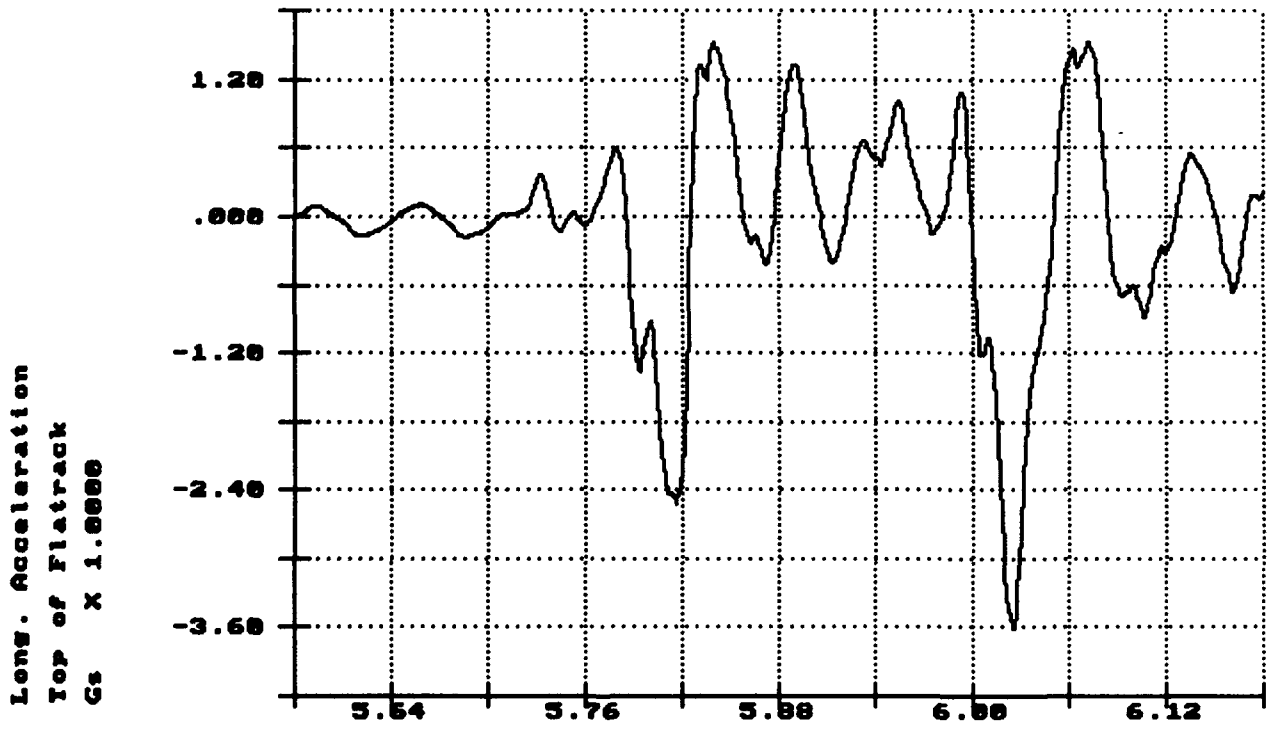
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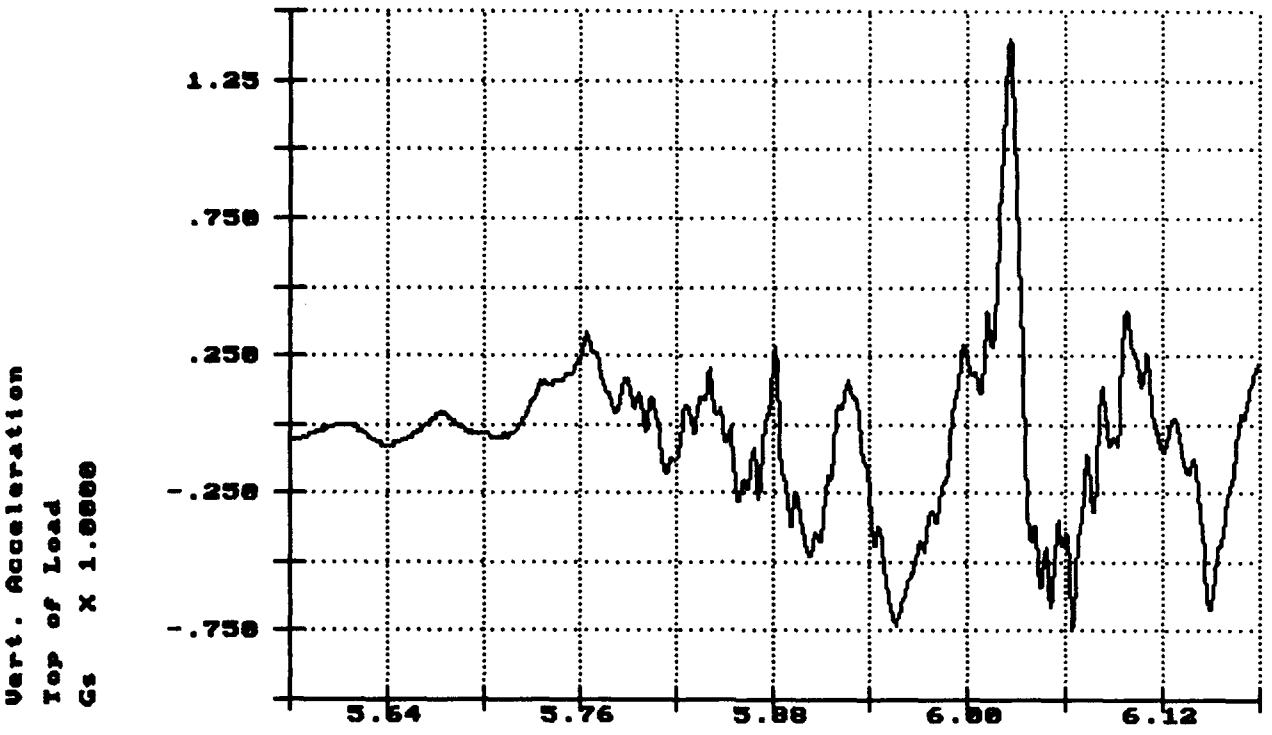
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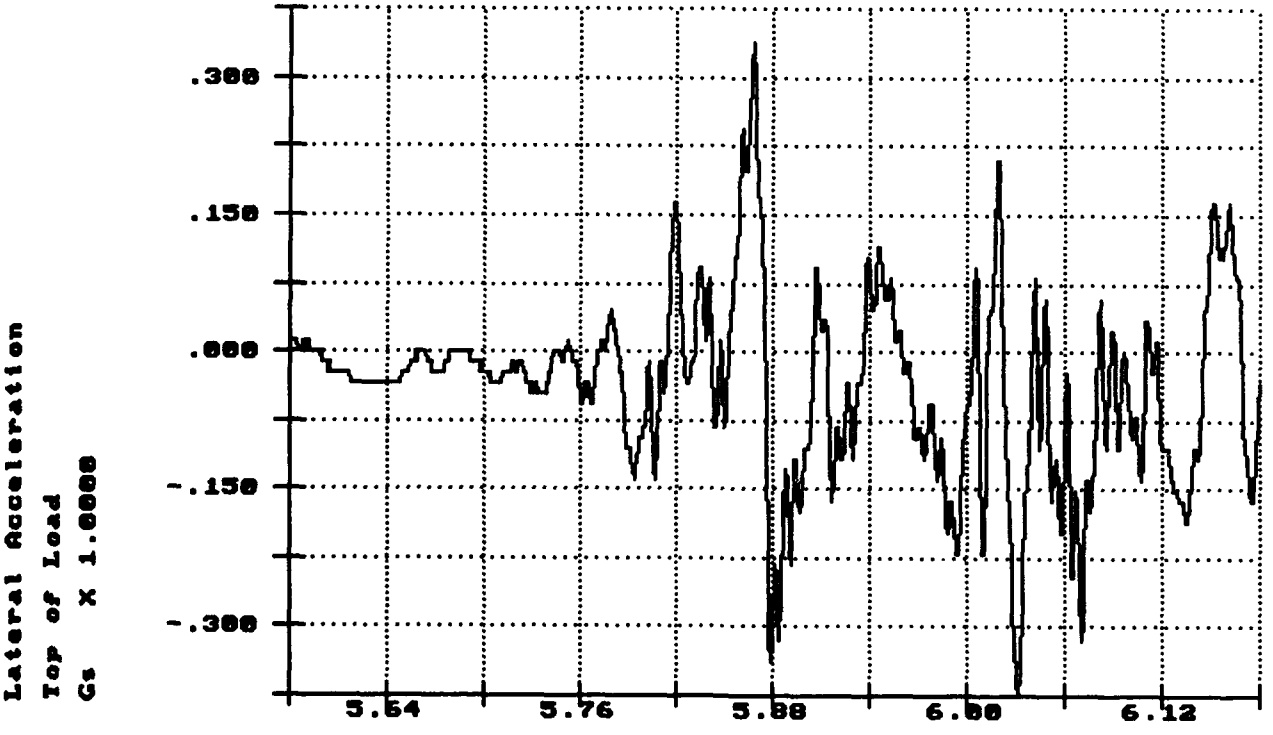
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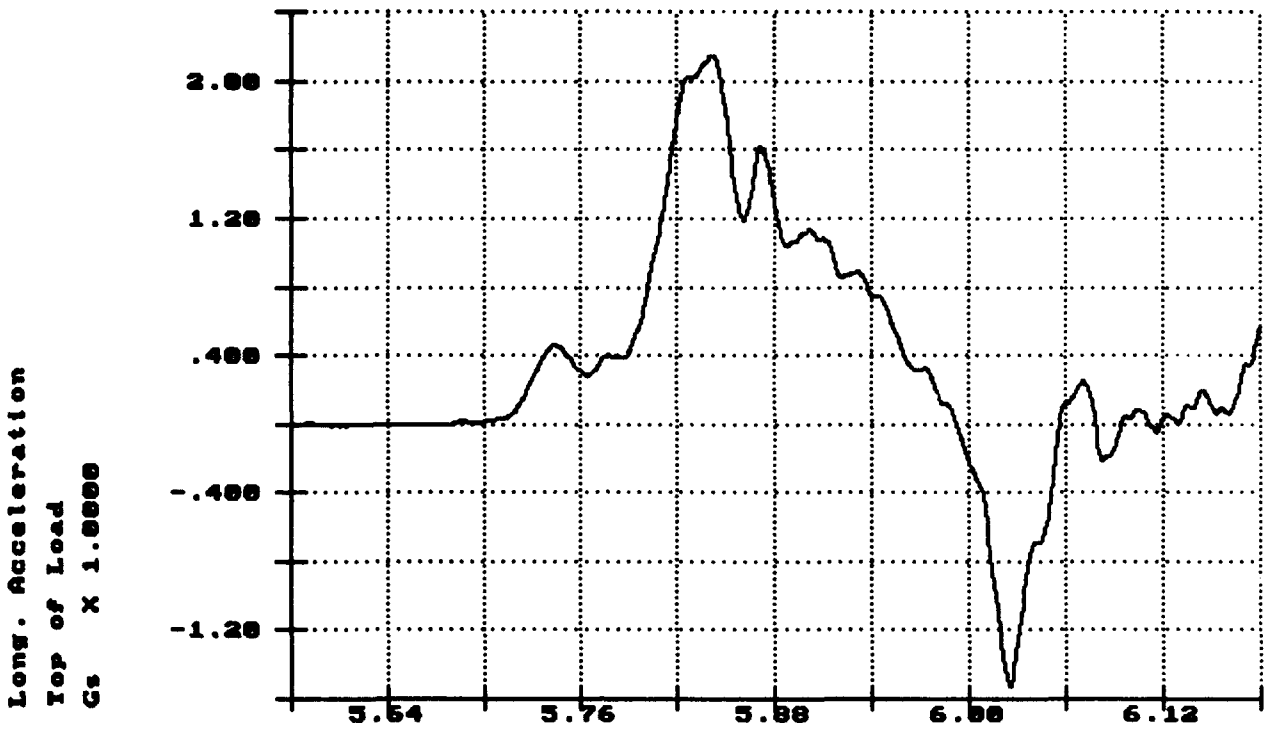
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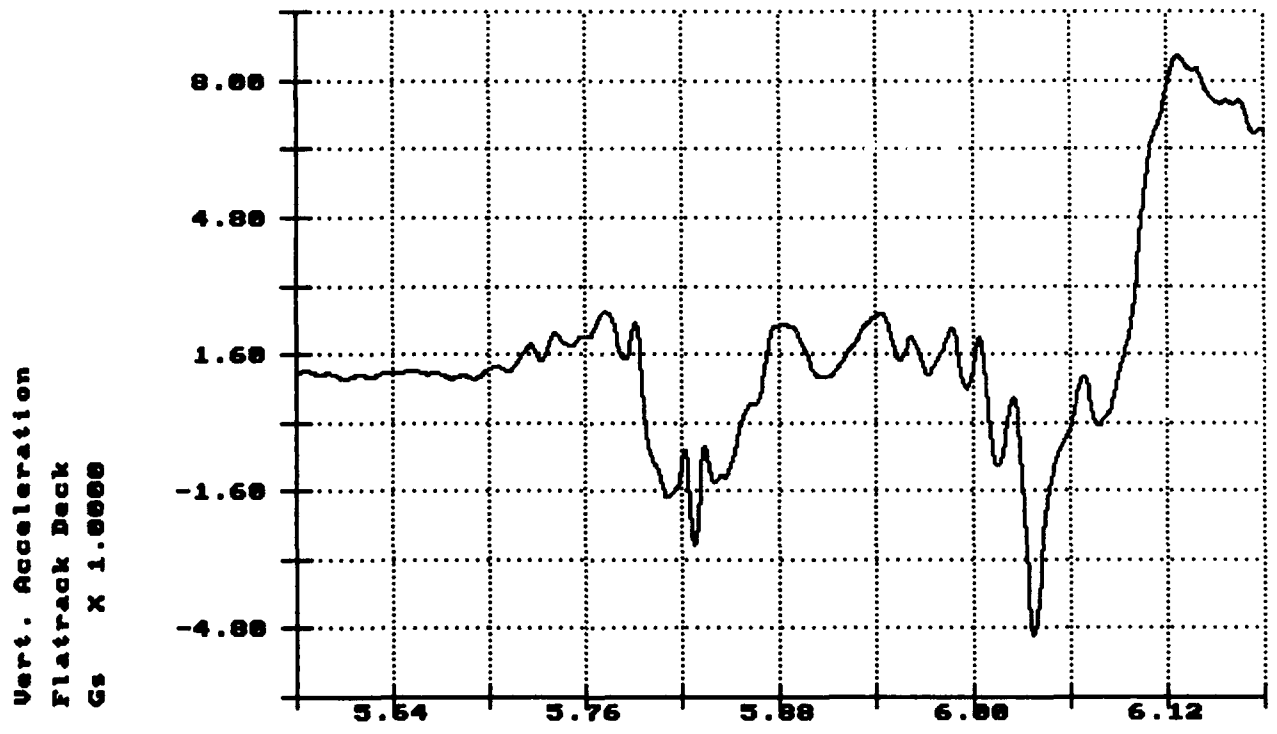
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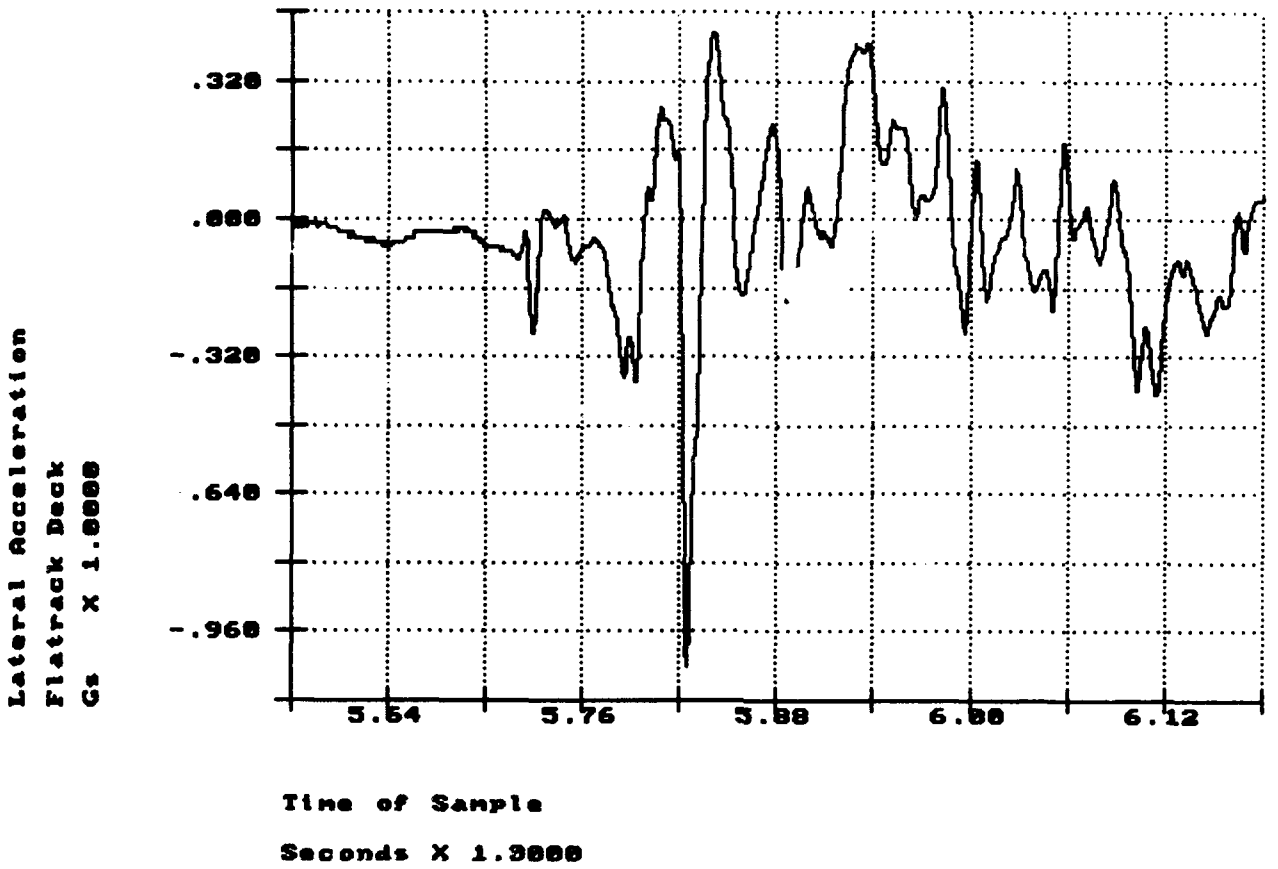
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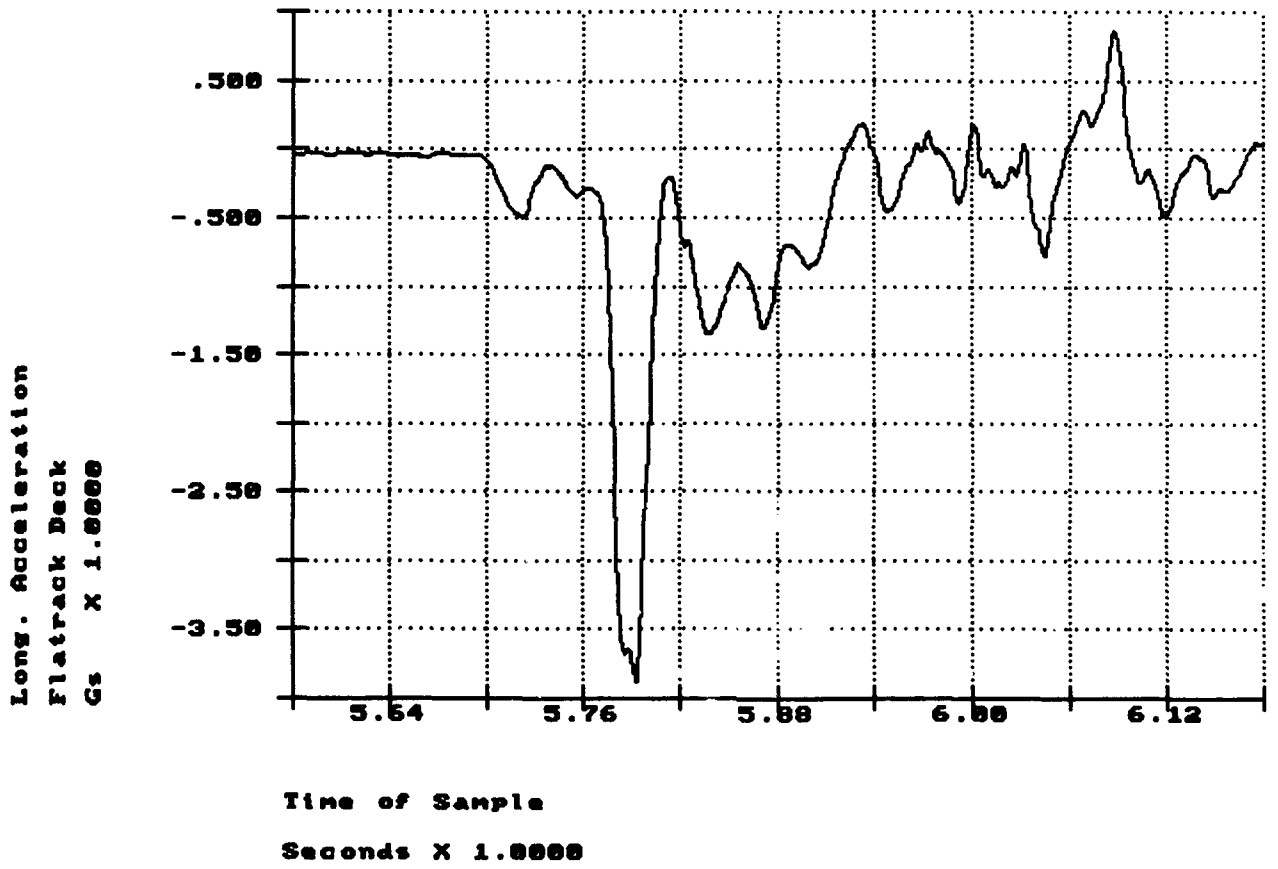
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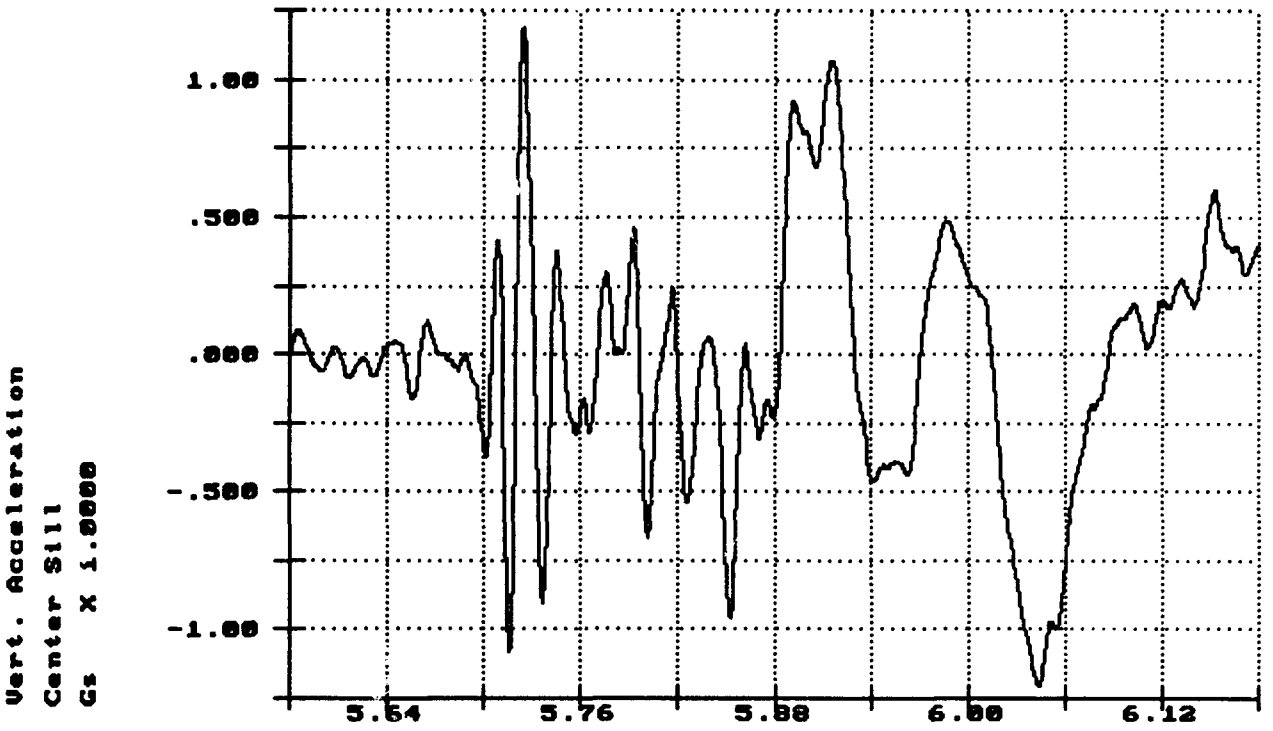
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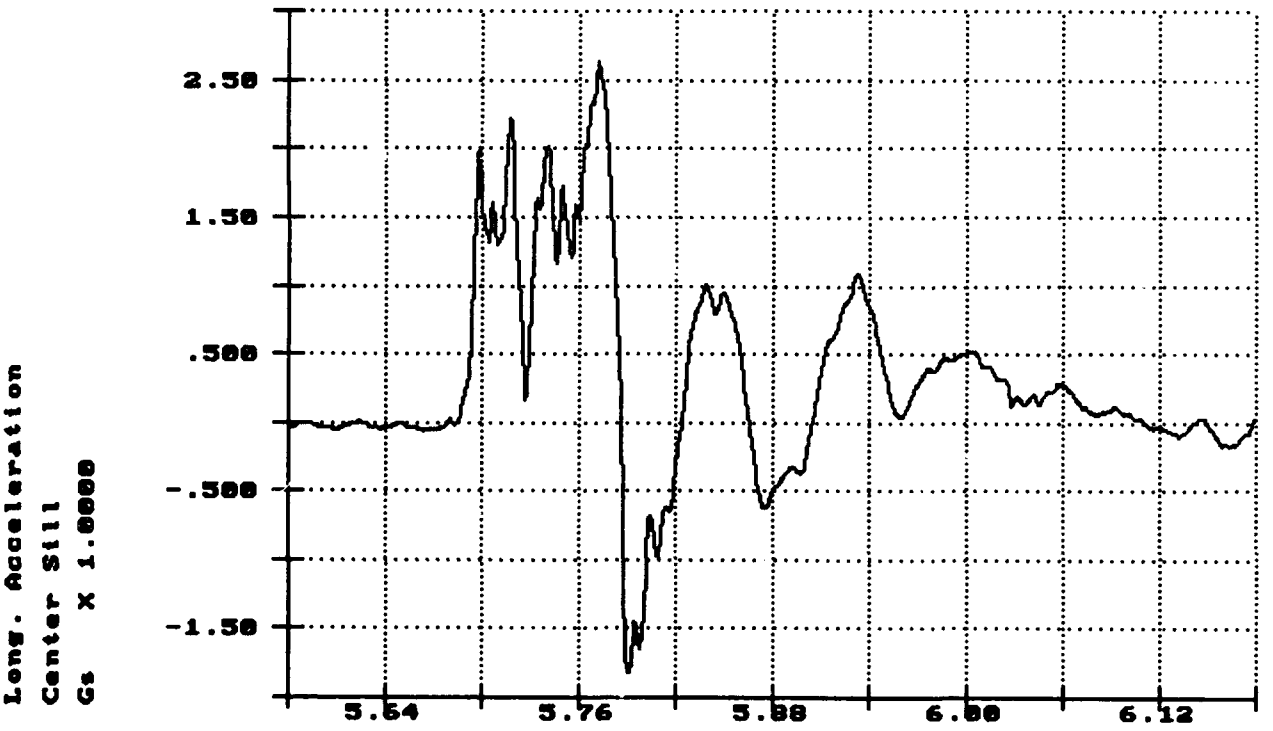
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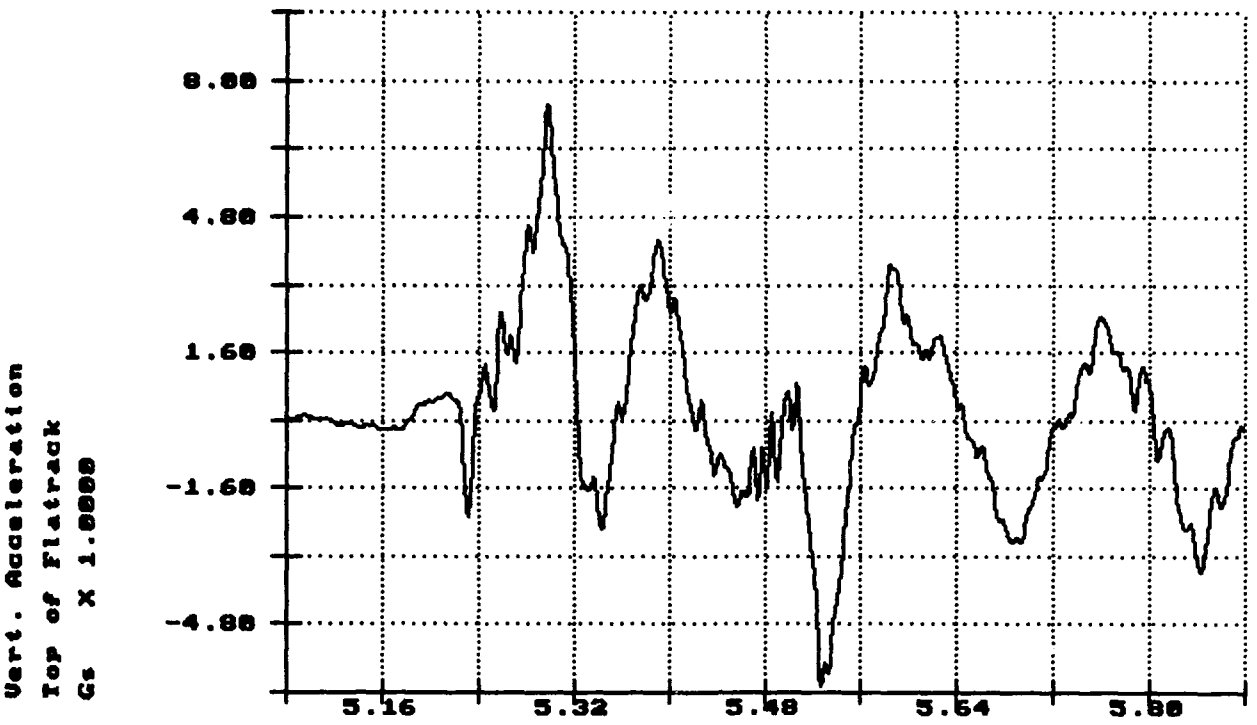
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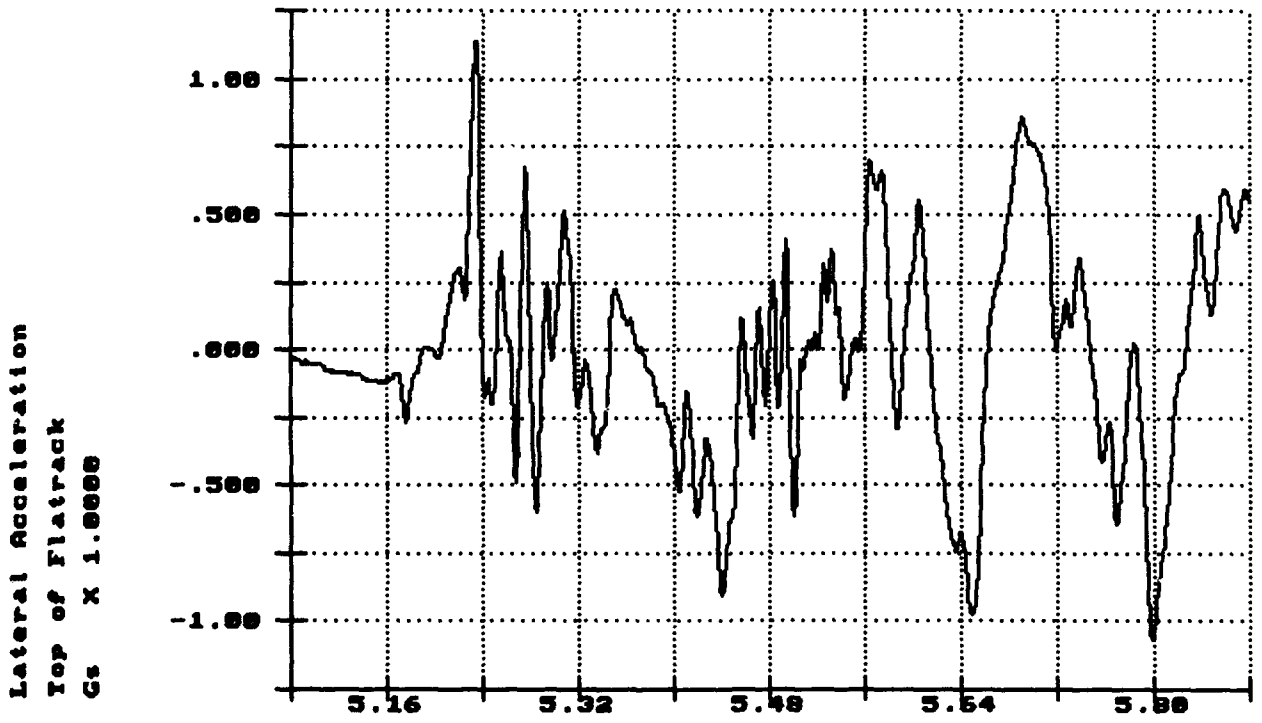
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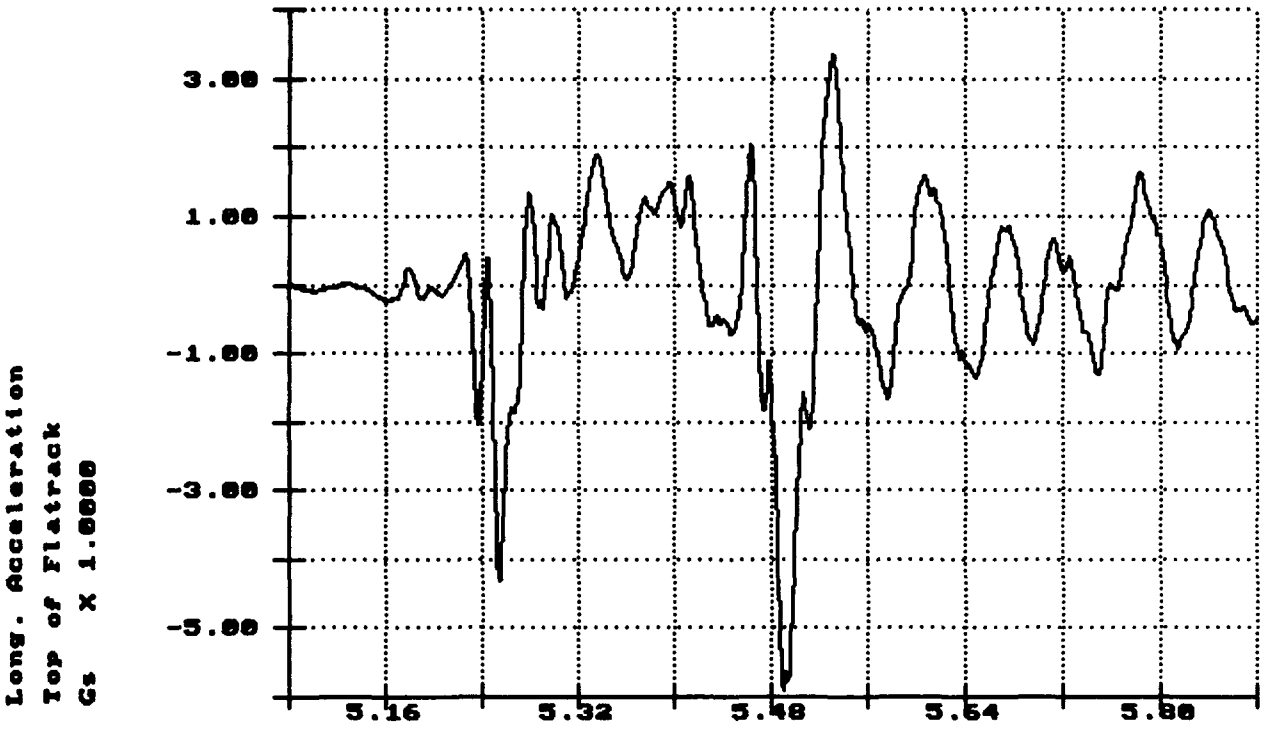
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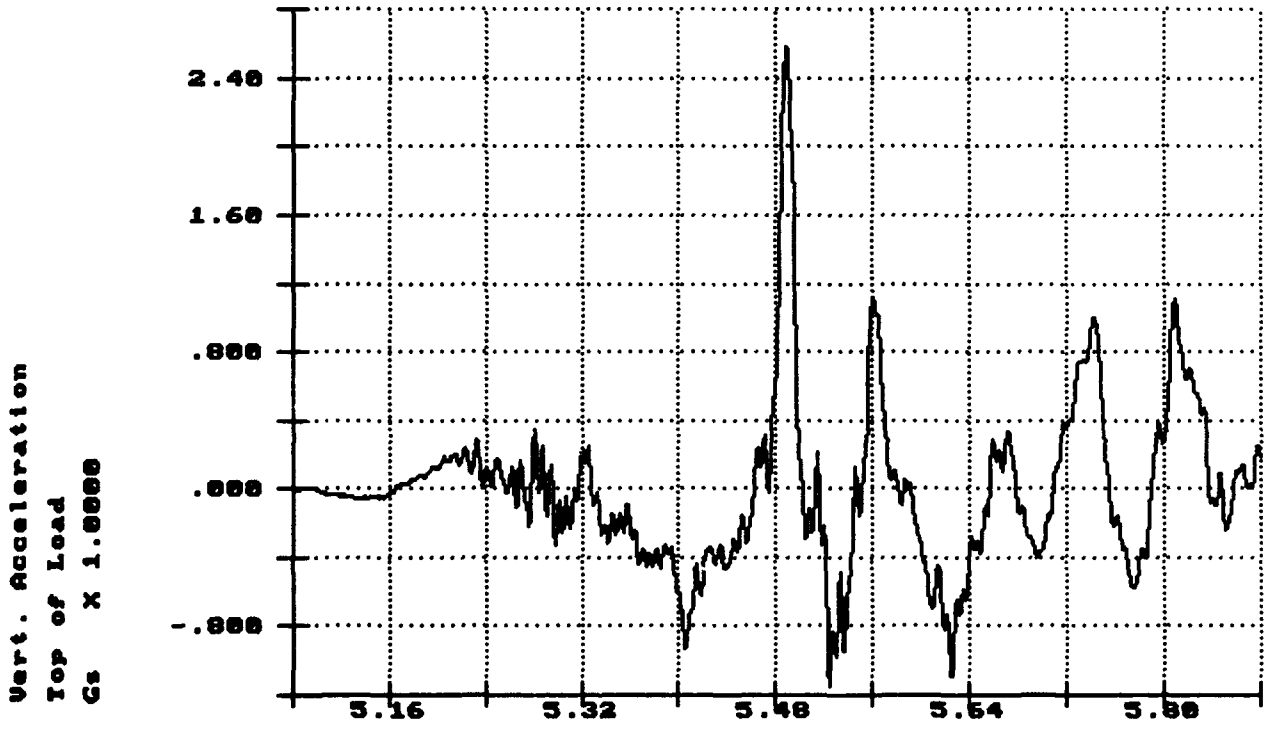
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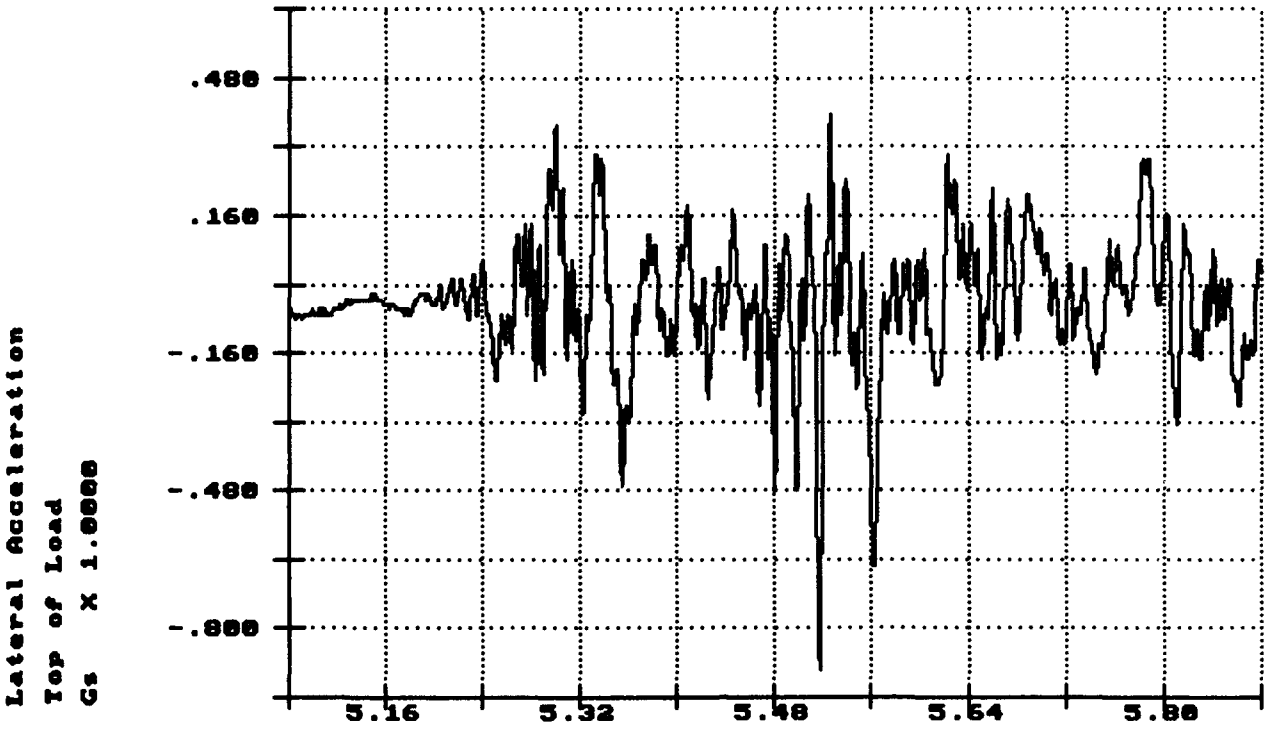
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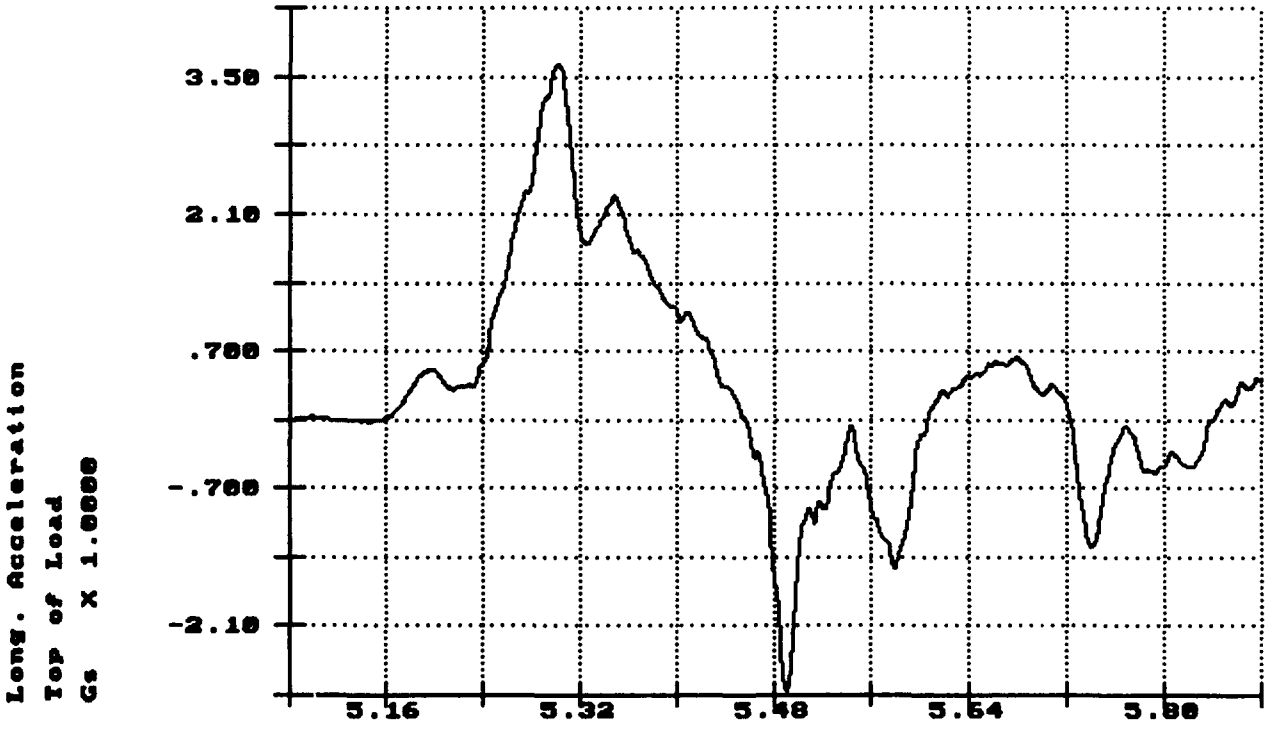
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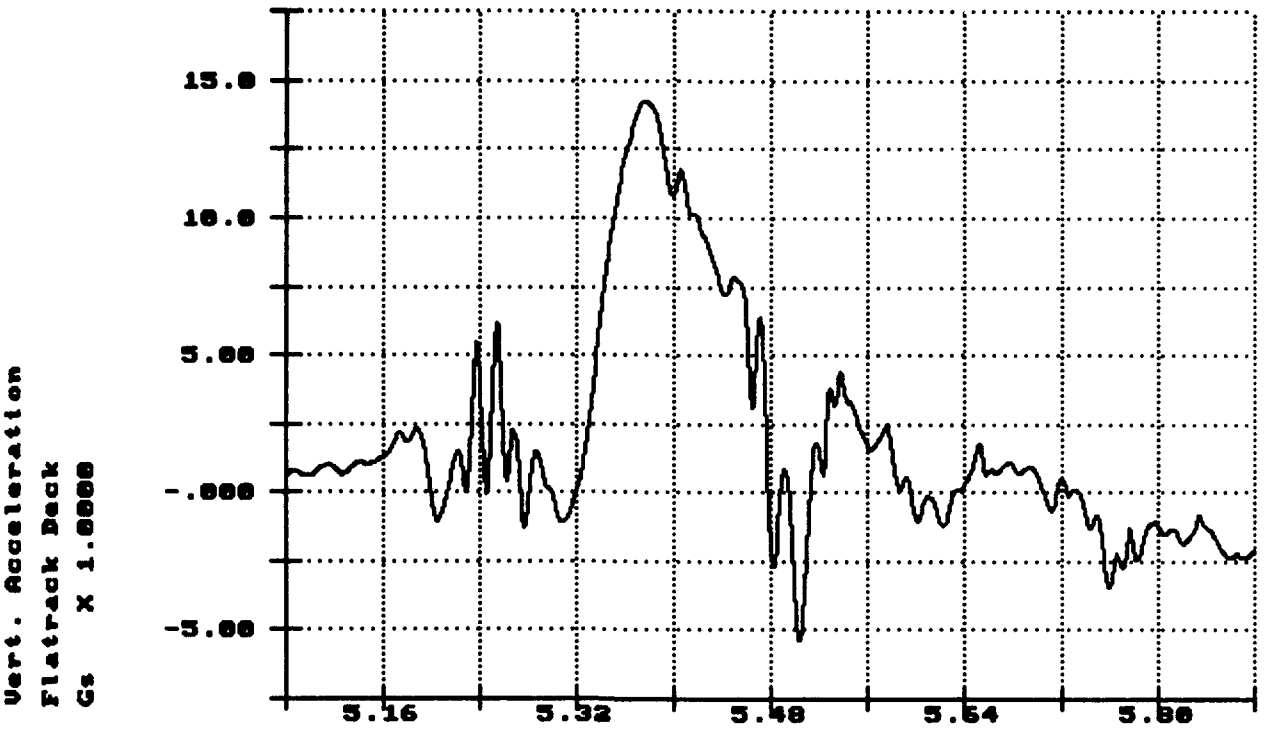
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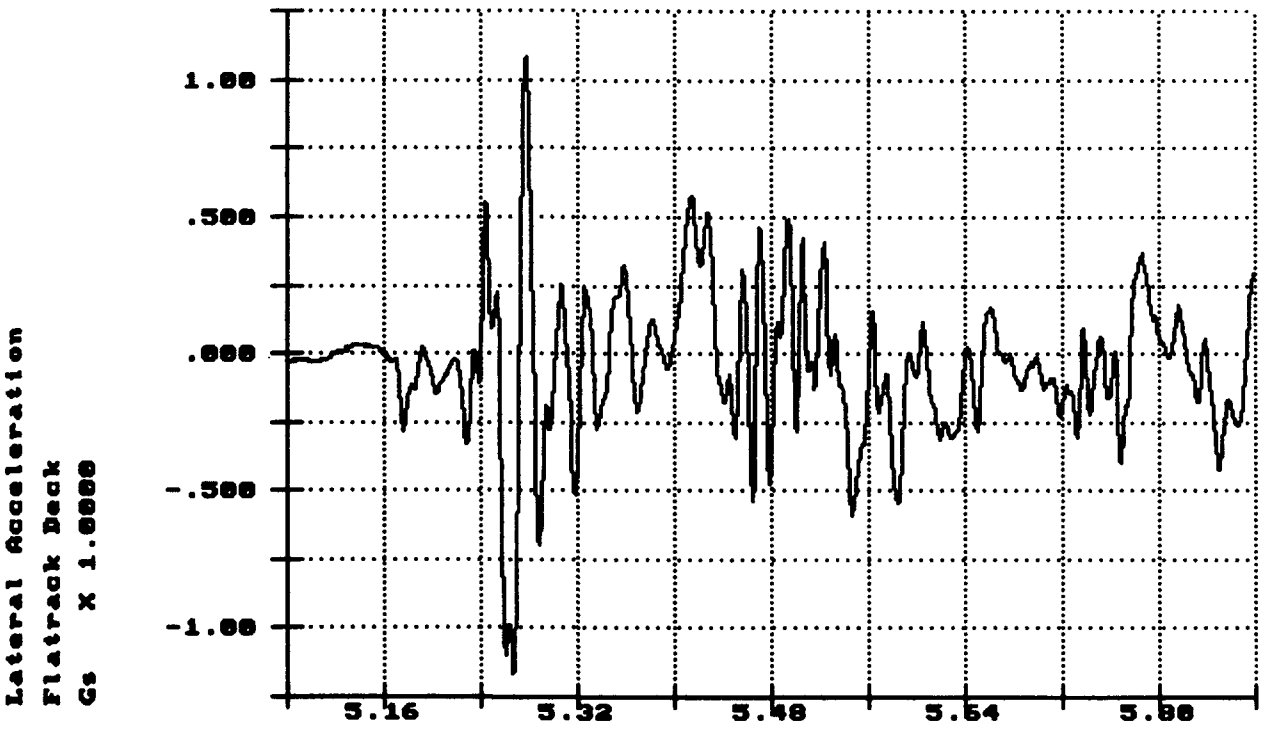
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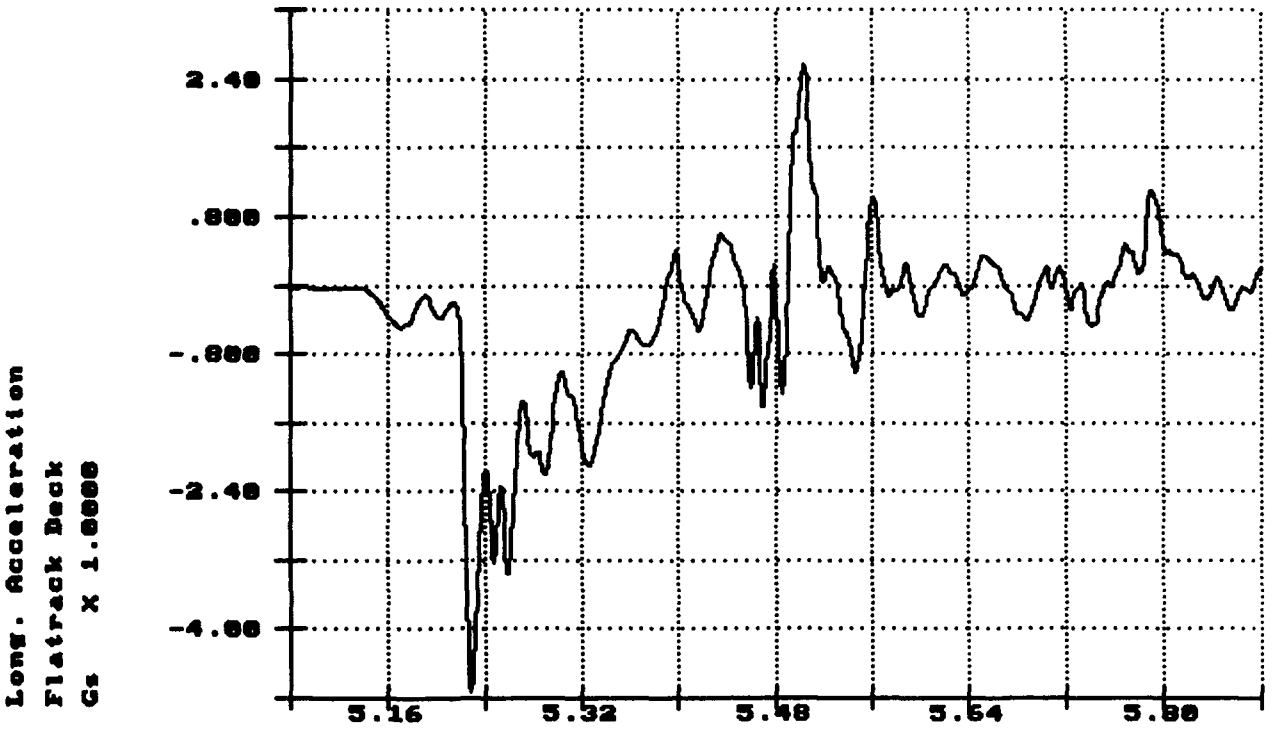
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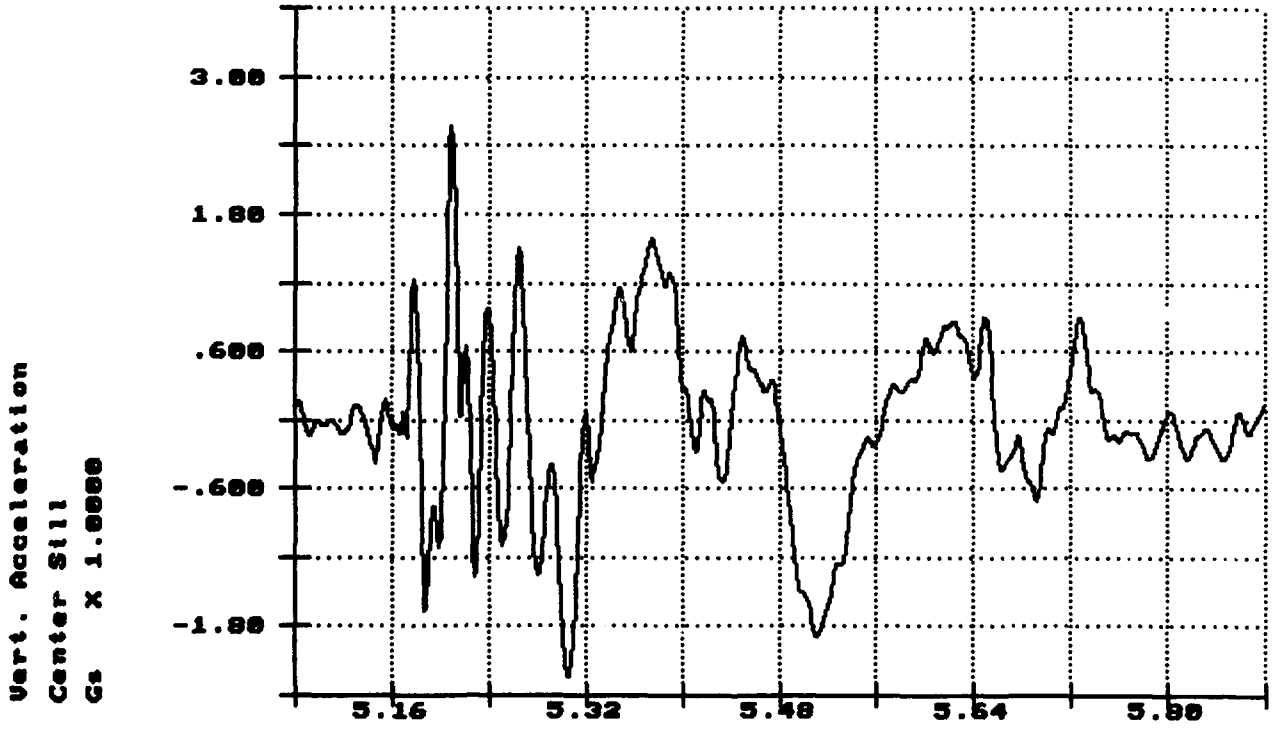
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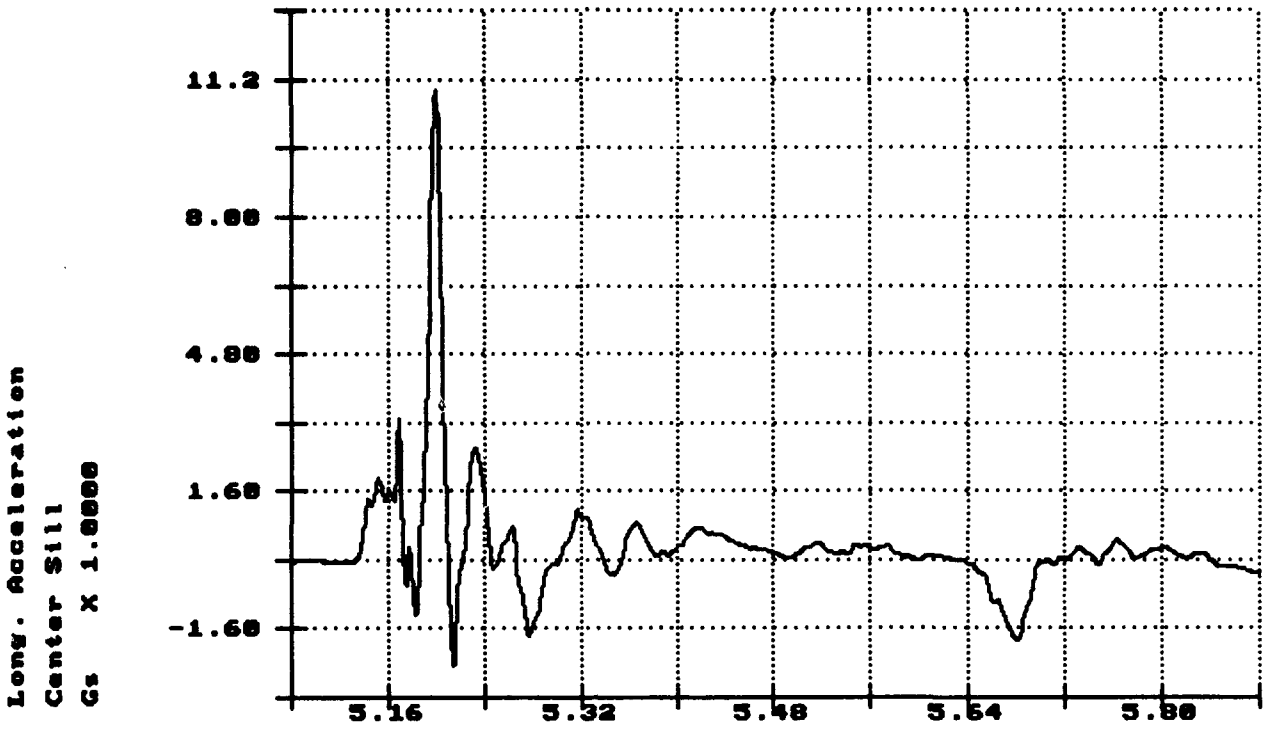
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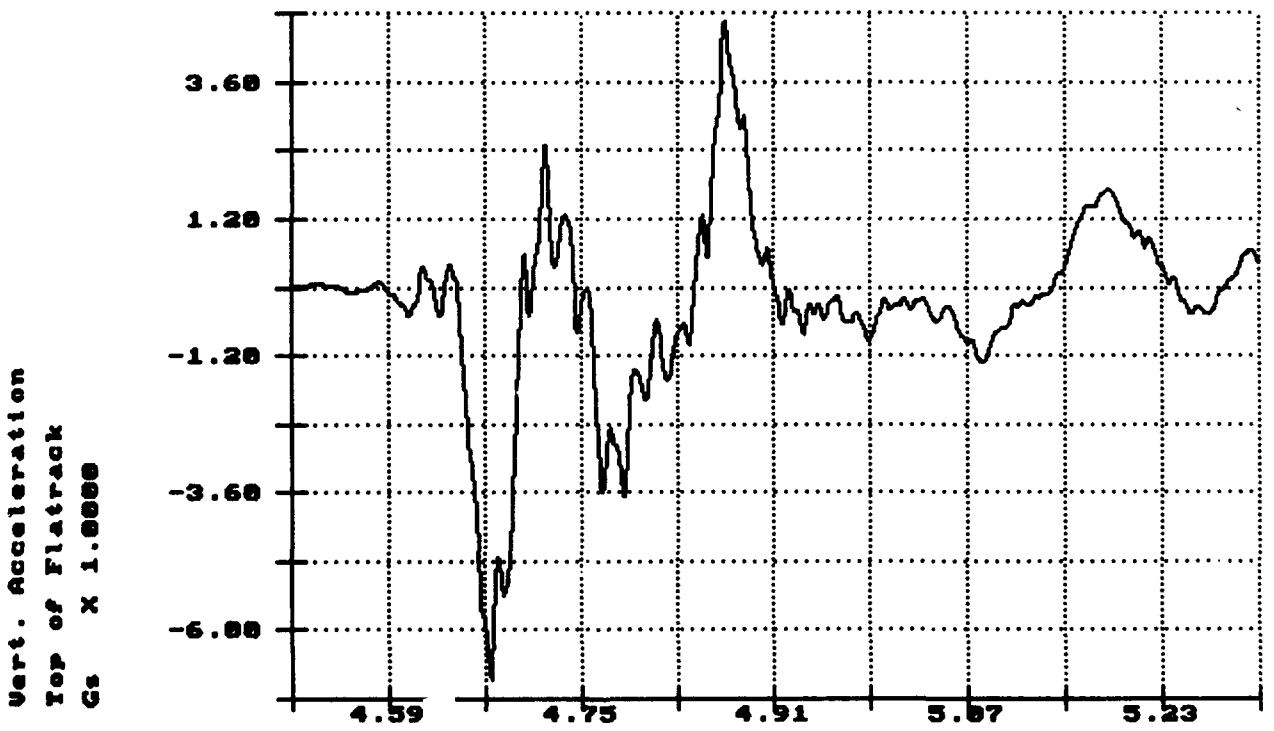
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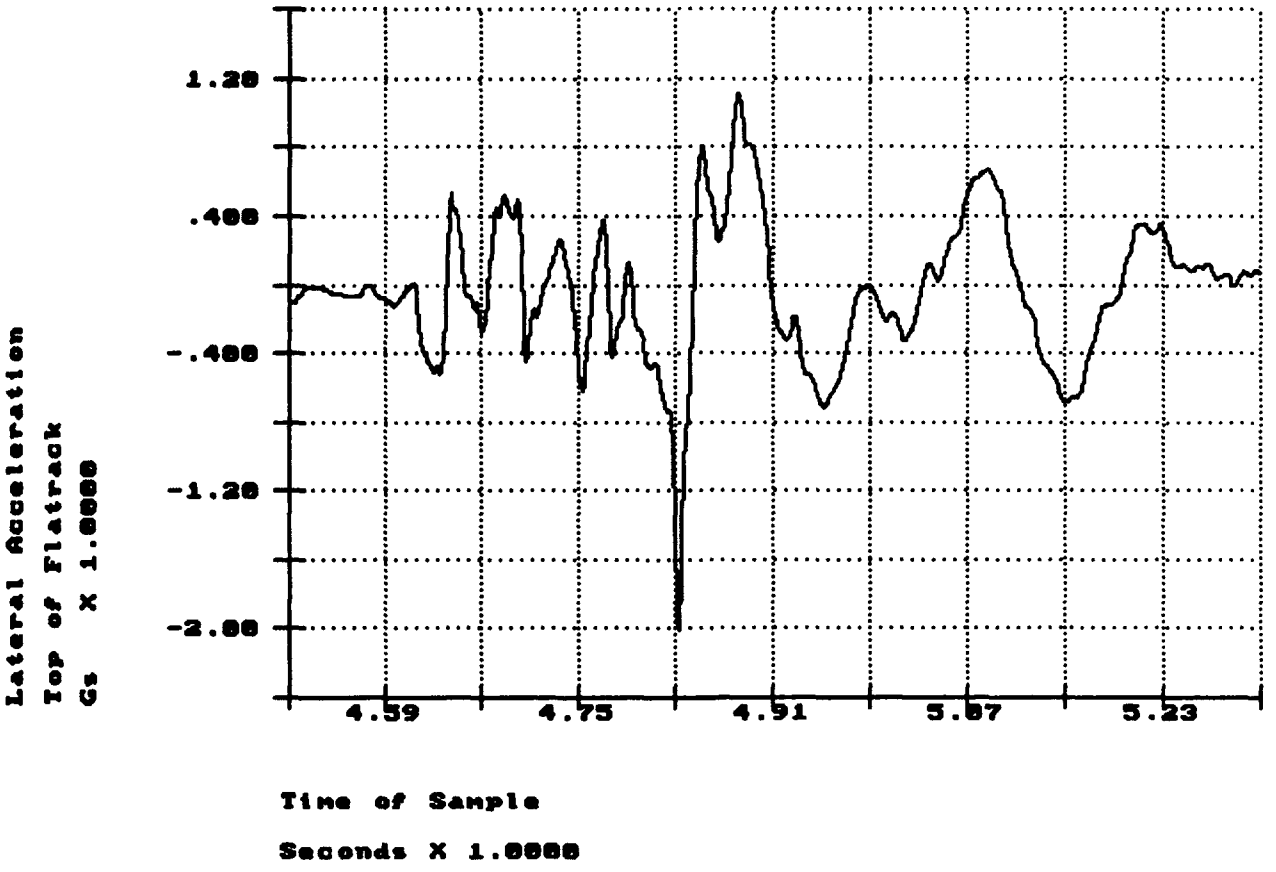
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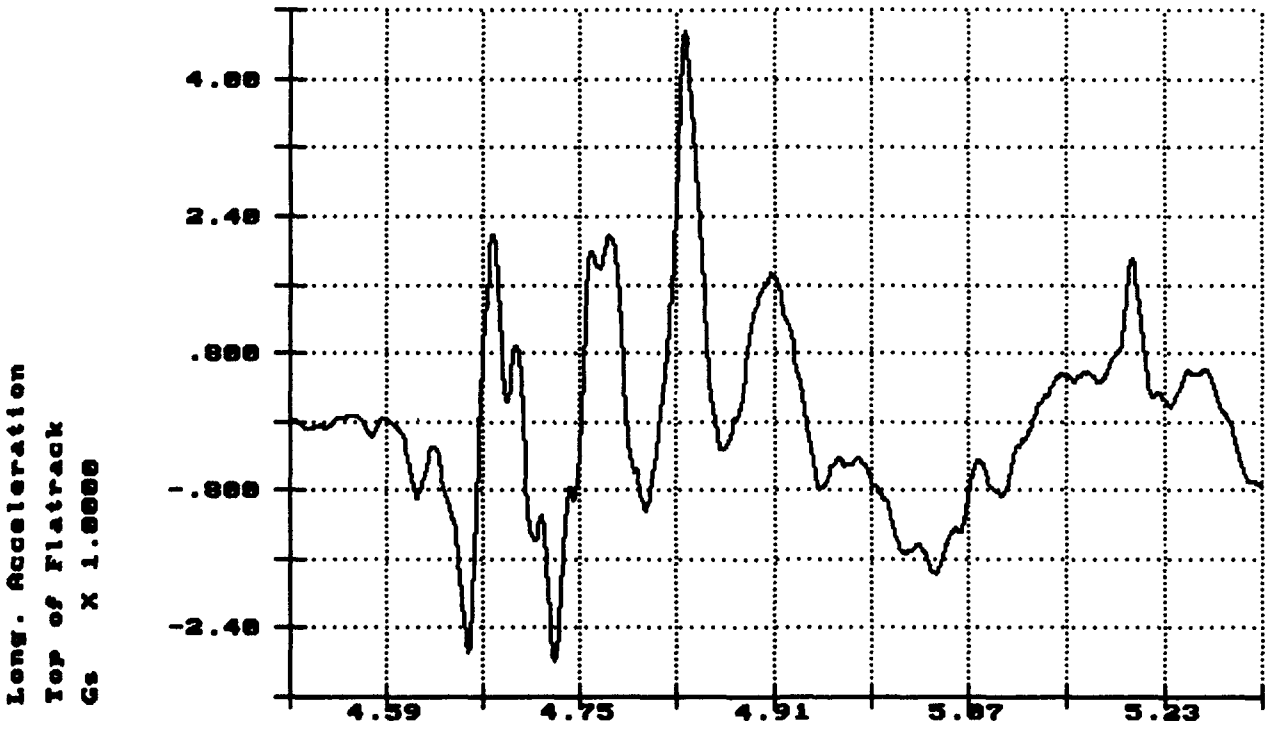
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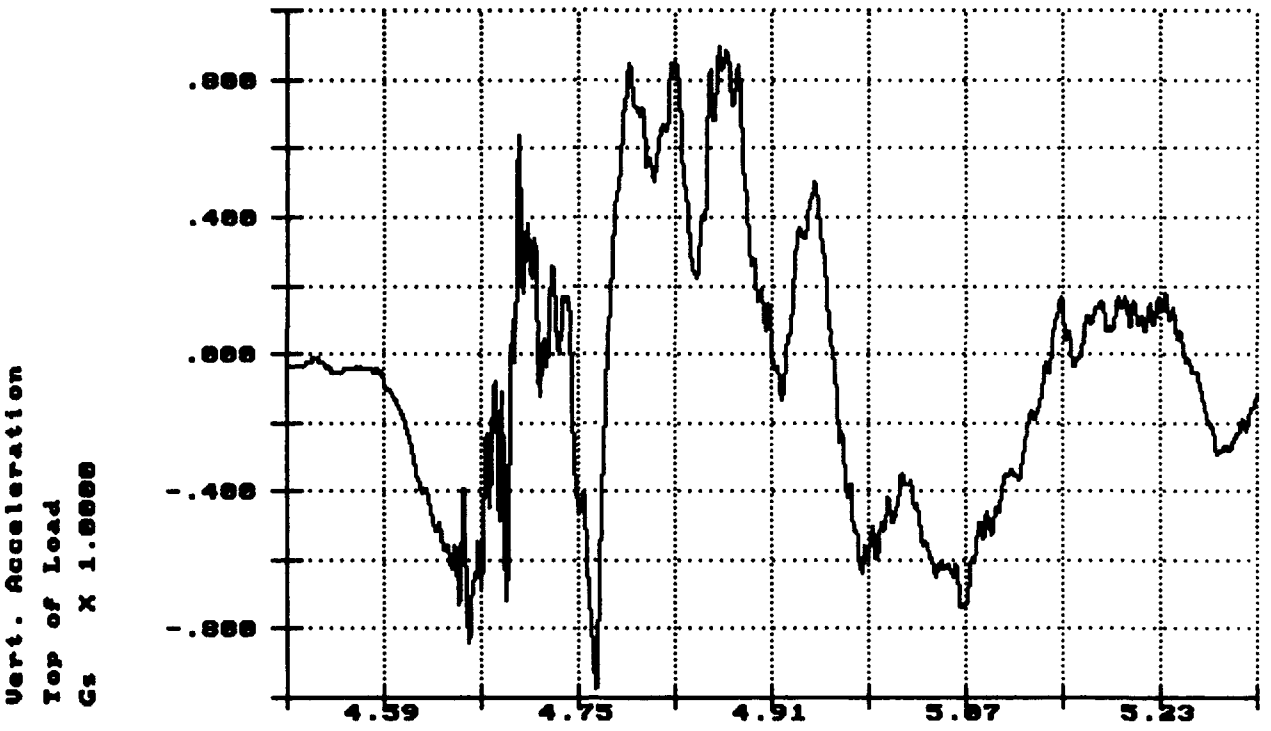
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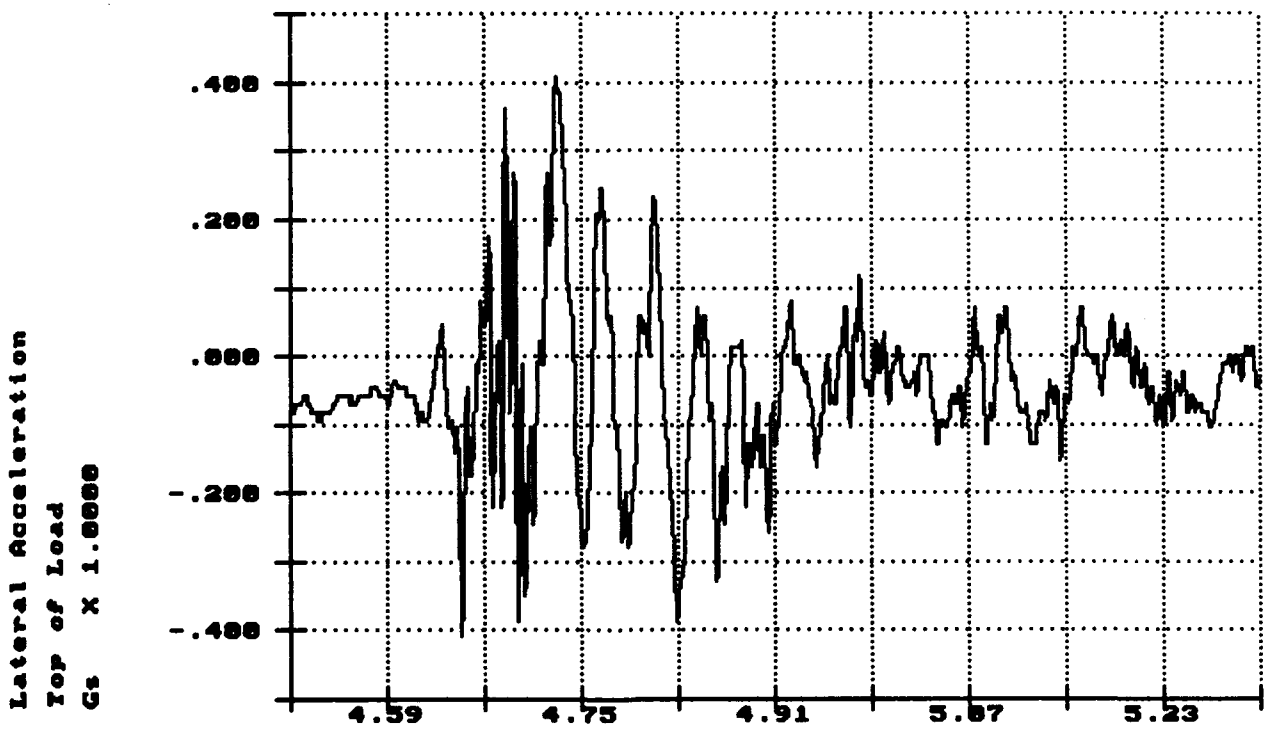
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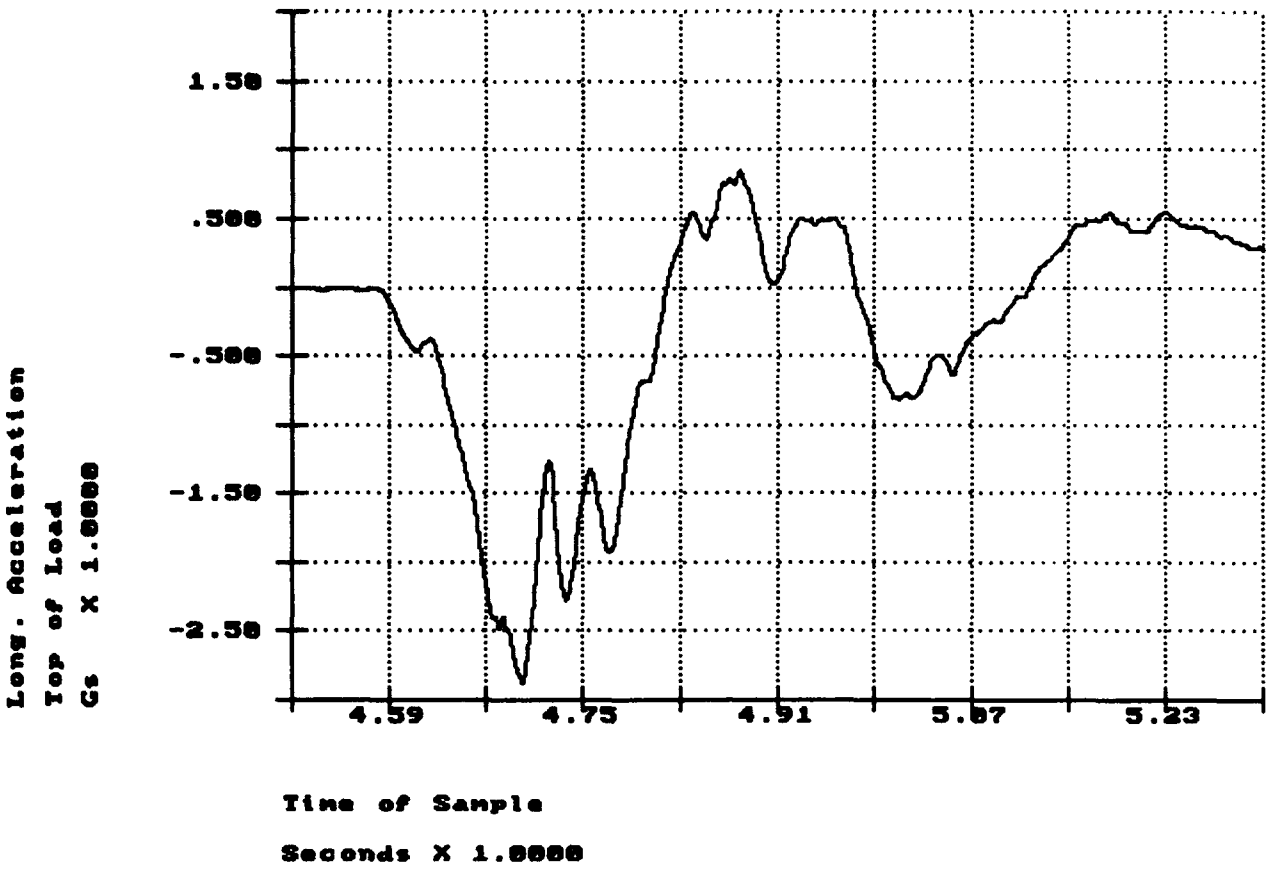
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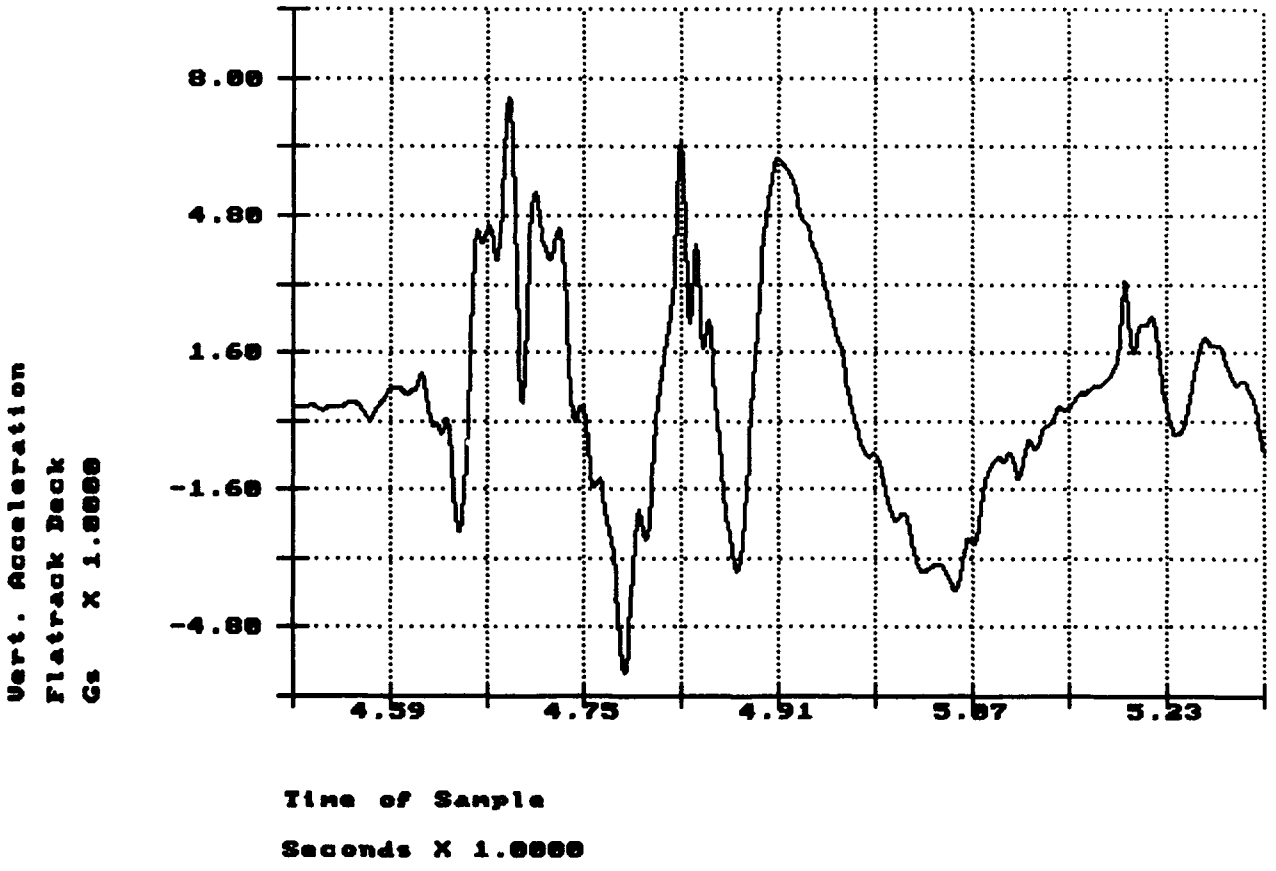
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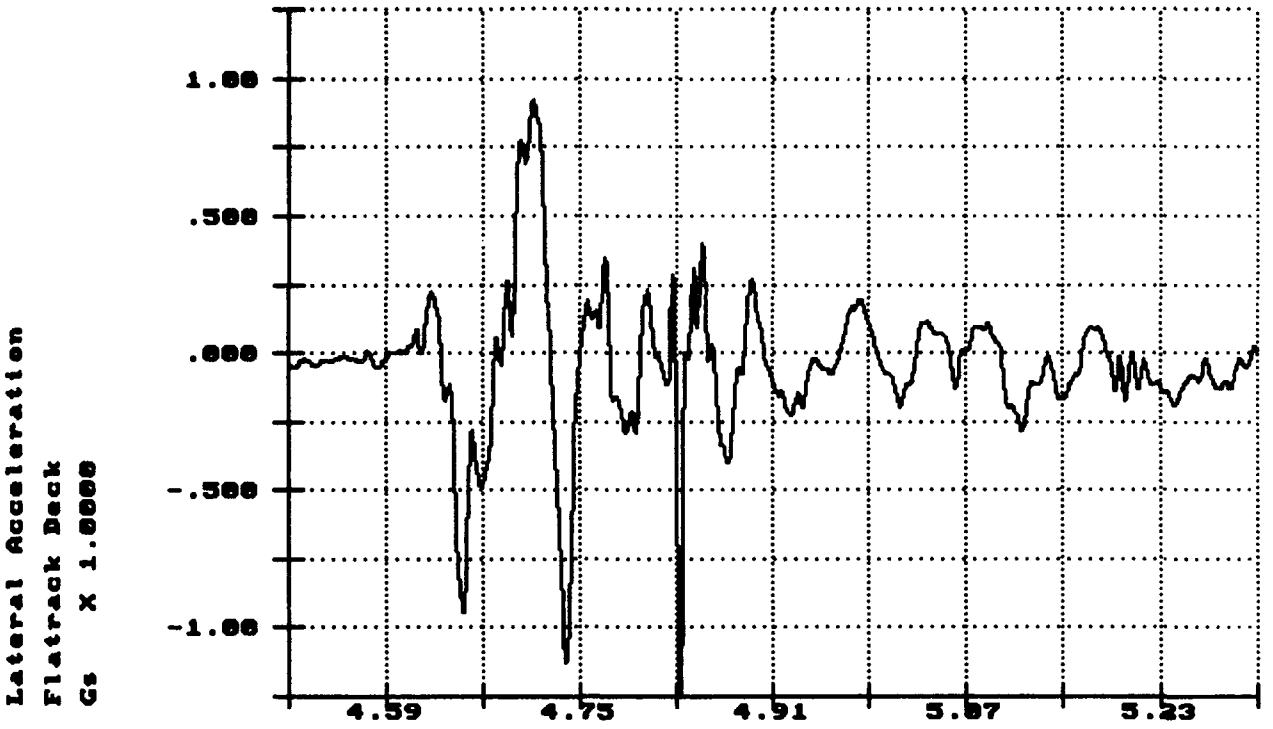
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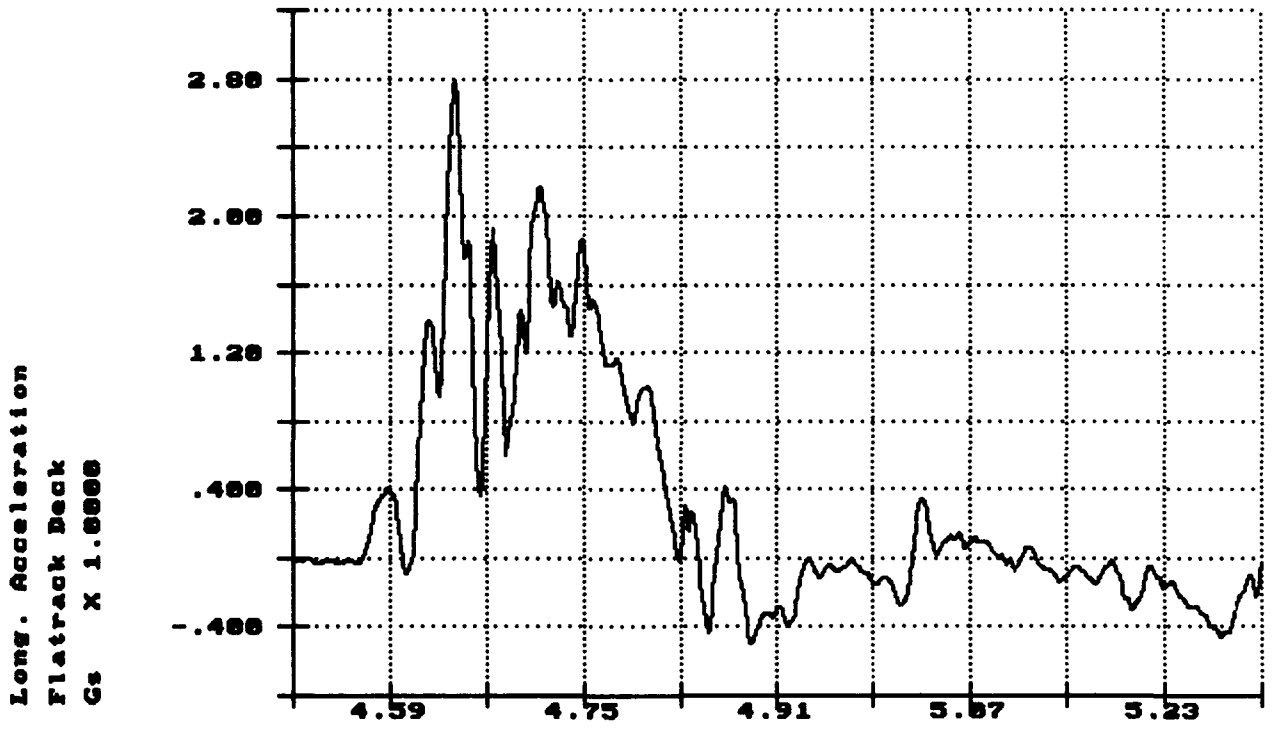
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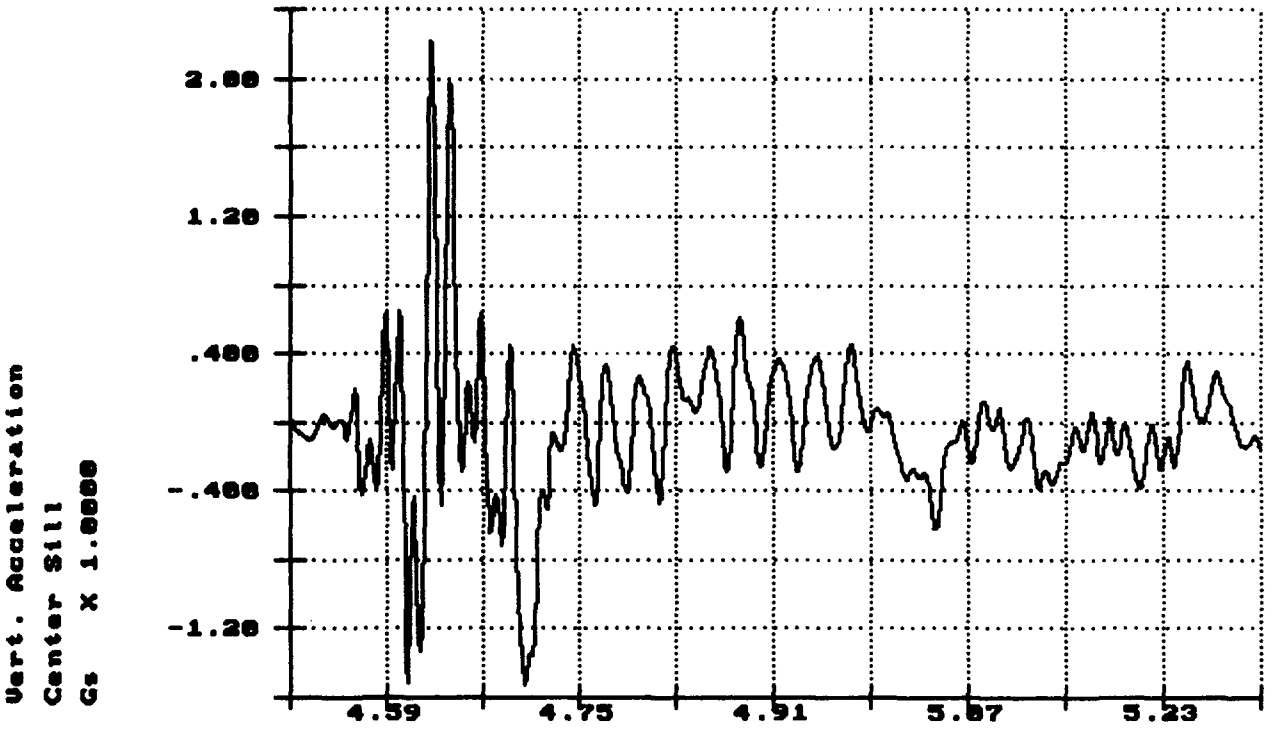
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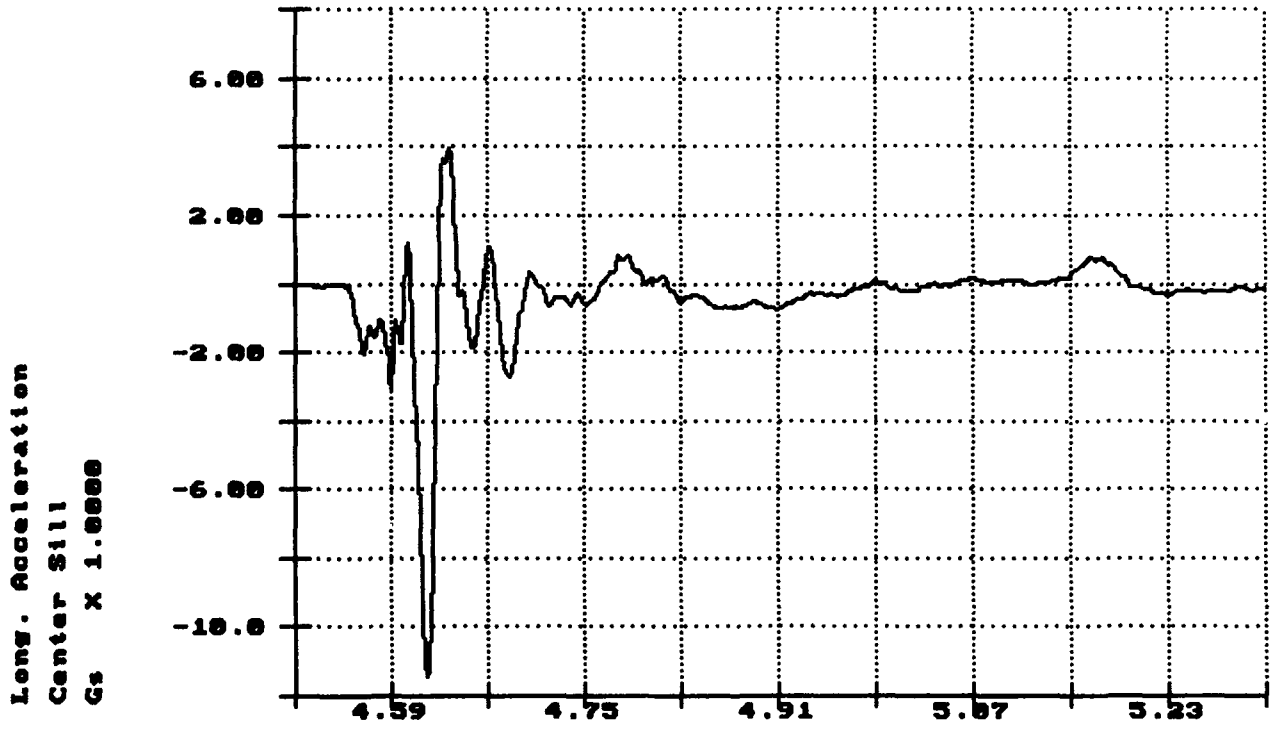
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R.I. of PLS Truck, Impact 4: 8.24MPH Dec 13 10:43:15 1993



R.I. of PLS Truck, Impact 4: 8.24MPH Dec 13 10:43:15 1993



TEST NO. 18

RAIL IMPACT DATA

Test No.: 18 Date: 13 December 1993

Specimen Load: PLS truck with an EPF loaded with MLRS pods.

Flatcar No.: EJ&E 6001	Lt. Wt.: 57,200
PLS Truck	Wt.: 54,750
EPF No. 2	Wt.: 7,500
Lading, MLRS Pods	Wt.: 22,000
	Total Specimen Wt.: 141,450
	Buffer Car (five cars) Wt: 250,000

Impact	End Struck	Velocity	Remarks
1	Rear	4.29	PLS truck cables remained tight. No load movement.
2	Rear	6.85	PLS truck cables remained tight. A 3/4-inch gap between the 4- by 4-inch dunnage and MLRS pods developed at the front of the load.
3	Rear	8.15	No change in dunnage and the MLRS pods at the front of the load. Long cables on the rear of the truck were loose.
4	Forward	8.24	The longest and middle set of tiedown cables loosened at the front of the PLS truck. No deformation observed in the front tiedown fittings on the truck. The MLRS frame cut approximately 1/8-inch into the wood blocking.

TEST NO. 19

ROAD TEST DATA

Test No.: 19 Date: 14 December 1993

Specimen Loads: EPF with MLRS pods loaded on the PLS trailer and an EPF with 155MM propelling charge containers on wooden pallets loaded on the PLS truck.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.50 SEC	5.2 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	6.34 SEC	5.4 MPH

REMARKS: No damage to the EPF or load movement.

PASS 2-A OVER FIRST SERIES OF TIES:	6.33 SEC	5.2 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	6.43 SEC	5.1 MPH

REMARKS: No damage to the EPF or load movement.

30-MILE ROAD TEST: No damage or load movement.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	6.36 SEC	5.4 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	6.27 SEC	5.4 MPH

REMARKS: No damage or load movement.

PASS 4-A OVER FIRST SERIES OF TIES:	6.61 SEC	5.0 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	6.01 SEC	5.4 MPH

REMARKS: No damage or load movement.

WASHBOARD COURSE: No observed damage or load movement.

TEST NO. 20

ROAD TEST DATA

Test No.: 20 Date: 14 December 1993

Specimen Loads: EPF with MLRS pods loaded on the PLS truck and an EPF with 155MM propelling charge containers on wooden pallets loaded on the PLS trailer.

ROAD HAZARD COURSE:

PASS 1-A OVER FIRST SERIES OF TIES:	6.65 SEC	5.1 MPH
PASS 1-B OVER SECOND SERIES OF TIES:	6.10 SEC	5.4 MPH

REMARKS: No damage to the EPF or load movement.

PASS 2-A OVER FIRST SERIES OF TIES:	6.56 SEC	5.2 MPH
PASS 2-B OVER SECOND SERIES OF TIES:	6.77 SEC	4.8 MPH

REMARKS: No damage to the EPF or load movement.

30-MILE ROAD TEST: No damage or load movement.

PANIC STOP TEST: No panic stops were performed since this load was previously rail impact tested.

PASS 3-A OVER FIRST SERIES OF TIES:	6.43 SEC	5.3 MPH
PASS 3-B OVER SECOND SERIES OF TIES:	6.99 SEC	4.7 MPH

REMARKS: No damage or load movement.

PASS 4-A OVER FIRST SERIES OF TIES:	6.12 SEC	5.3 MPH
PASS 4-B OVER SECOND SERIES OF TIES:	6.87 SEC	4.8 MPH

REMARKS: No damage or load movement.

WASHBOARD COURSE: No observed damage or load movement.

TEST NO. 21

Test No.: 21 18 December 1993

Sideboard Evaluation

1. After transportability testing, an attempt was made to install the sideboard kit on the EPF loaded with 155MM propelling charge containers on wooden pallets. The load was secured to the EPF with 2-inch metal banding. The load was symmetrical on the EPF deck with approximately 2 inches of space between the inside of the EPF side rail and the load pallet skids. The 2-inch metal banding was secured to the tiedown fittings on the outside of the EPF side rail.

2. The first sideboard, positioned at the bail bar end on the right side of the EPF, distorted as the lower edge of the sideboard was engaged in the lock mounted on the end wall and the sideboard post was inserted into the receptacle mounted on the EPF side rail. The sideboard could not be fully pushed down into the mounts due to the interference between the plywood siding and the 2-inch metal band used to secure the load between the end wall and the sideboard mounting post receptacle. A mallet was used to drive the post into full engagement causing excessive distortion of the side wall.

3. An attempt was made to install a second sideboard with less success. This sideboard interfered with two metal bands used to secure the 155MM propelling charge container load. A mallet was used to drive the post into the mount without ever being able to fully seat the post. Again, distortion was observed in the sideboard due to interference from the banding.

4. As a check, a web strap was placed over the load and secured so that the ratchet assembly was on the right side of the EPF. A third sideboard was attempted to be installed without success. The plywood sideboard interfered with the web strap ratchet and prevented it from

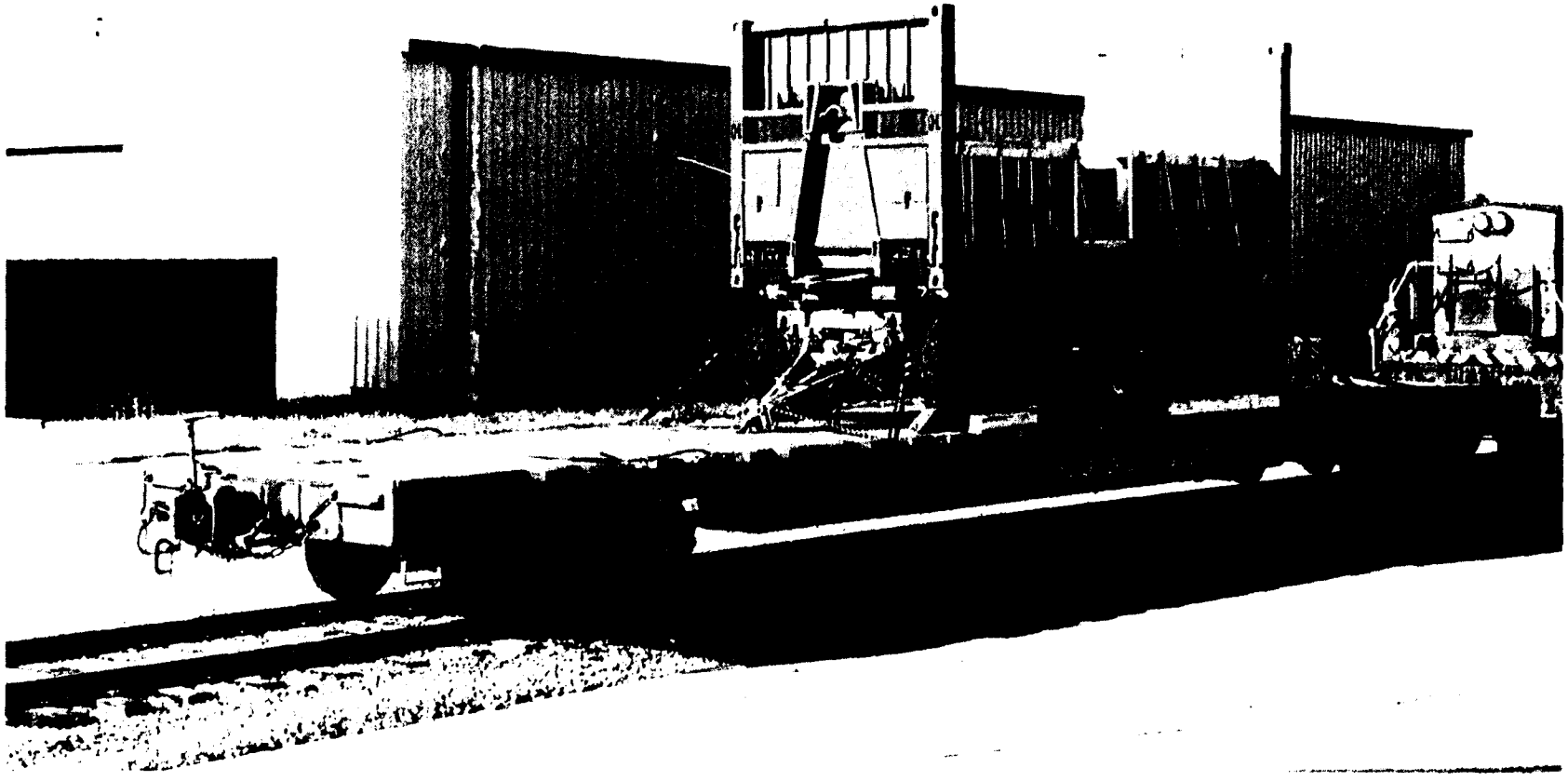
being fully seated in the mount on the EPF side rail. The sideboard prevented access to the ratchet for tightening or loosening of the strap.

5. These problems of interference between the sideboards and securements of the load occurred with a load that had several inches of clearance between the inside of the EPF side rail and the pallet base. Other loads, such as the 120MM tank ammunition metal pallets, extend from the outside of the EPF side rail to the outside of the opposite side. These loads are secured with 2-inch metal banding attached to the tiedown fittings on the outside of the EPF side rail. With these loads, sideboards cannot be fitted to the EPF because there is no space left on the EPF for them to be mounted.

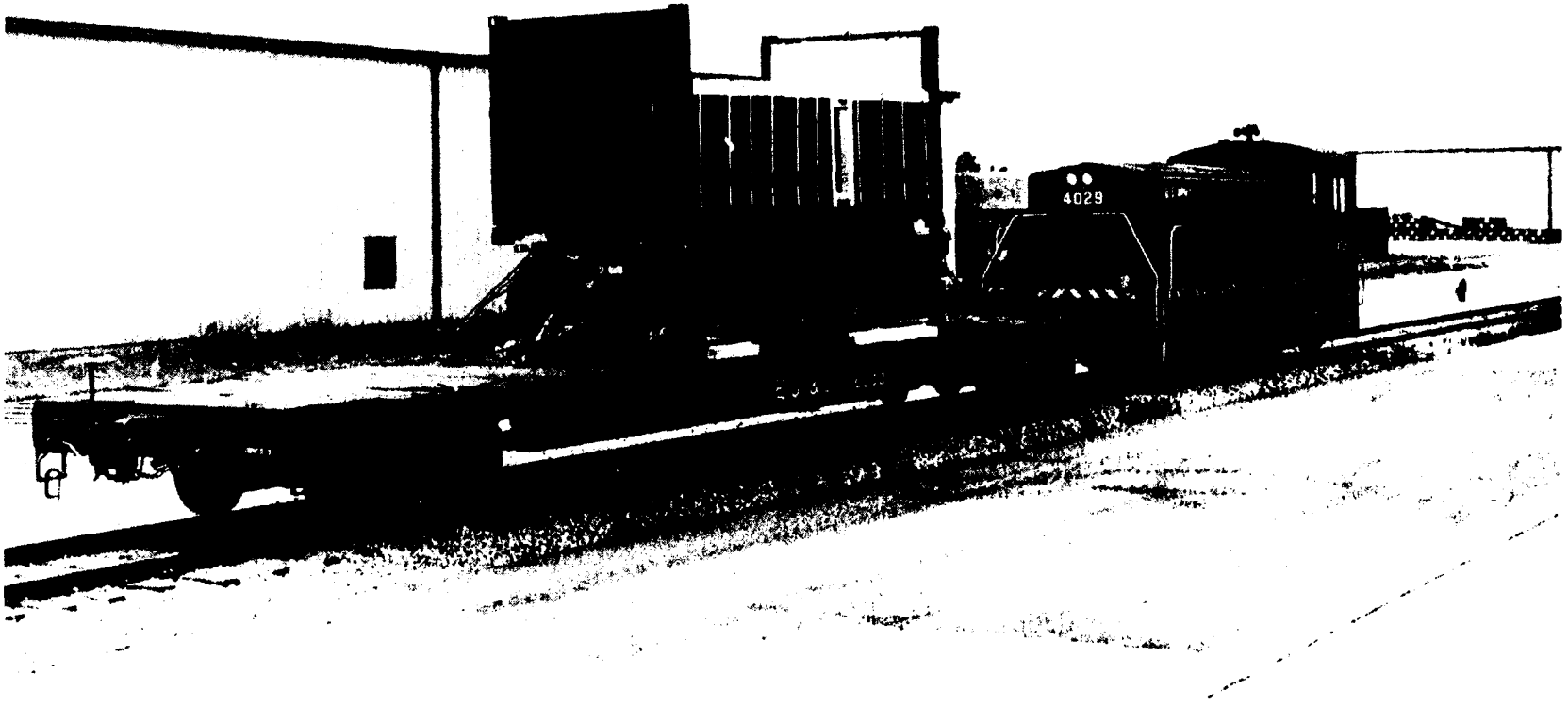
6. The sideboard mounting post design does not facilitate easy assembly to the EPF. The single post in the center of the sideboard allows the sideboard a large degree of position variation making it difficult to assemble along the side of the EPF and requires the installer to juggle it into position with the end post installed to the previous sideboard. Also, with the outside posts installed in the EPF side rail mounts, there is a tendency for the sideboards to bind between these posts if they are not held level to the EPF deck. To facilitate easier assembly, a sideboard should be constructed with a minimum of a post at each end of the sideboard section. This design change will provide the installer easier alignment and reduce the number of pieces required to be installed when using sideboards.

PART 5

PHOTOGRAPHS

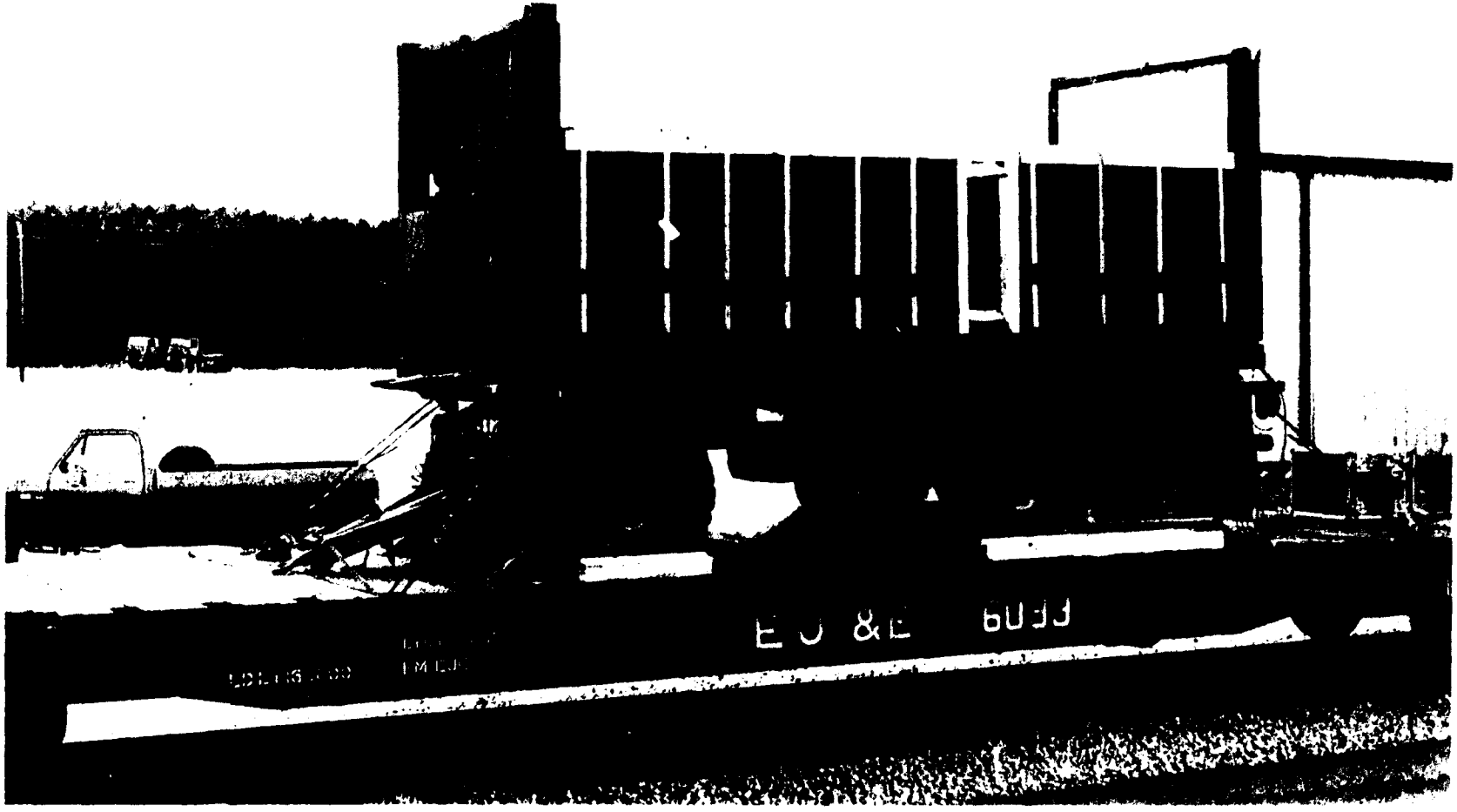


	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
Photo No. SCN-94-113-1399. This photo shows an EPF mounted on the PLS trailer being positioned for a rail impact. The EPF is secured to the trailer with steel pins. The trailer is secured to the flatcar with 5/8-inch wire rope. Note the chain holding the trailer tongue to the flatcar deck.		

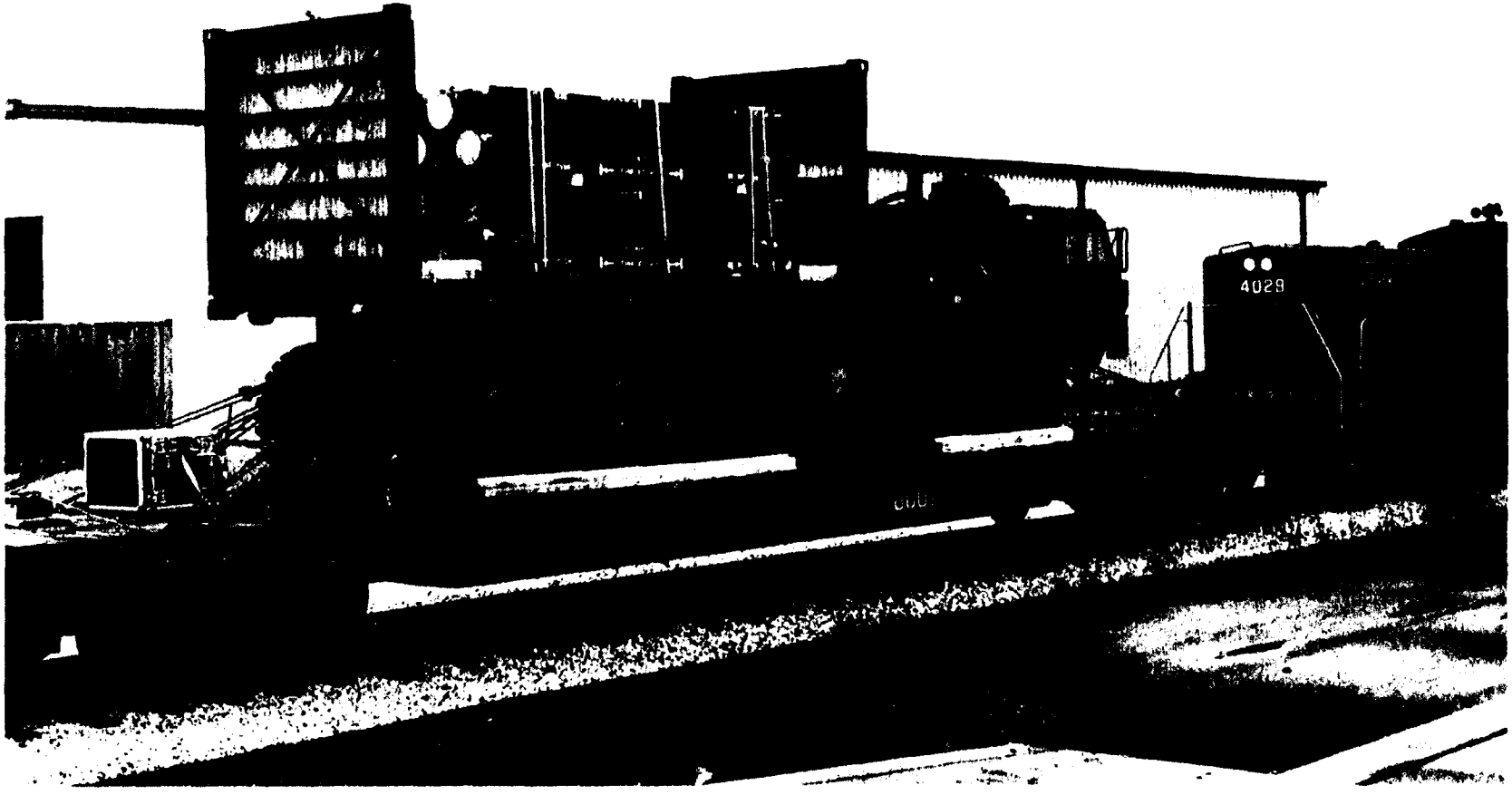


	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. SCN-94-113-1401. This photo shows an EPF mounted on the PLS trailer. The trailer is cabled to the flatcar. The locomotive is preparing to accelerate the loaded railcar to a speed suitable for rail impacting. The test load consists of PA116 120mm tank ammunition container metal pallets.

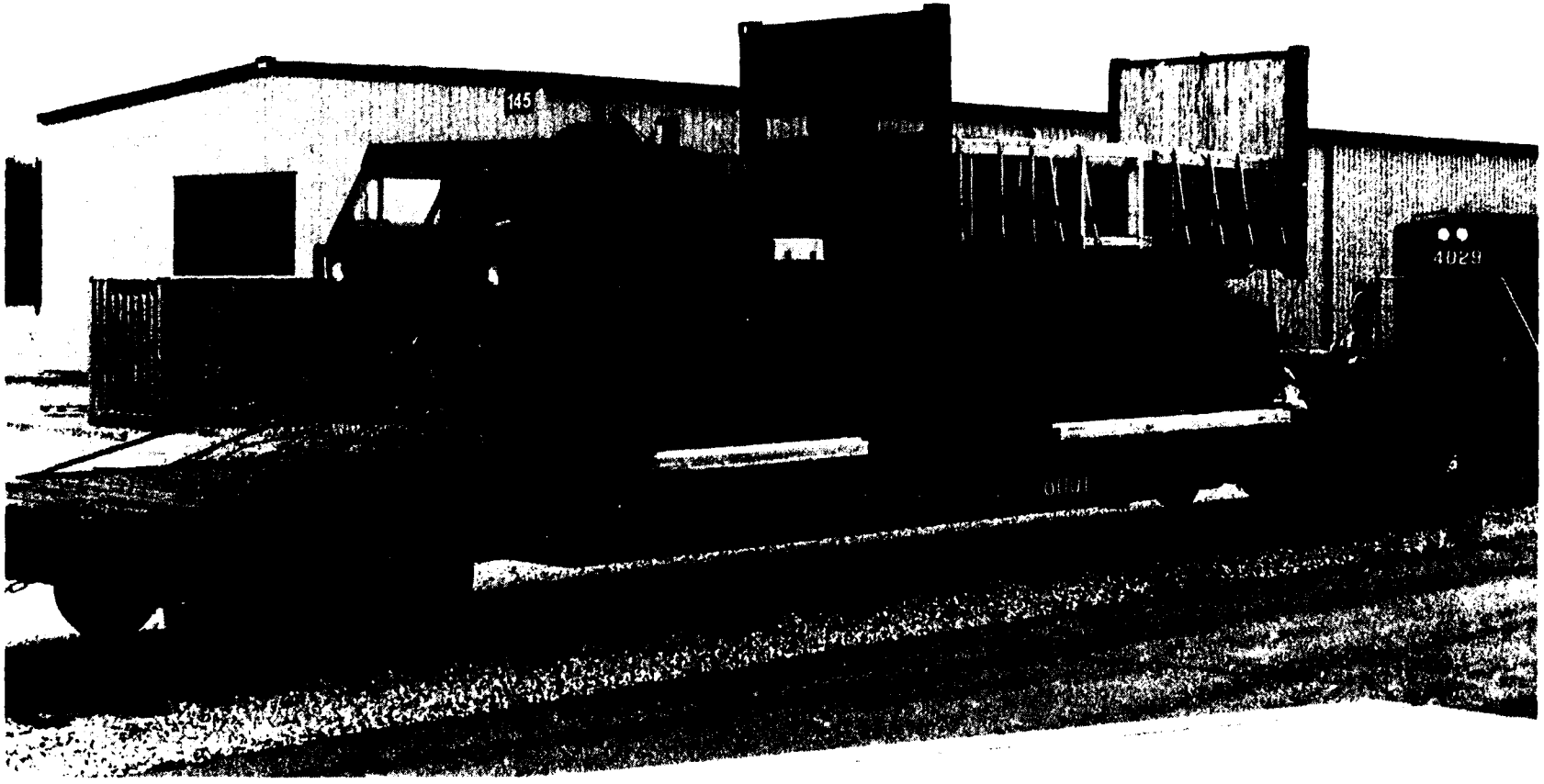


	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
Photo No. SCN-94-113-1402. This photo shows the EPF mounted on the PLS trailer. The trailer is cabled to the flatcar. The locomotive is preparing to accelerate the loaded railcar to a speed suitable for rail impacting. The test load consists of PA116 120mm tank ammunition container metal pallets.		



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. SCN-94-113-1418. This photo shows the EPF mounted on the PLS truck. The EPF is secured to the truck with steel pins. The pins are required for rail transportation only. The truck is secured to the railcar with six 5/8-inch wire rope cables. The ammunition load consists of four MLRS pods.



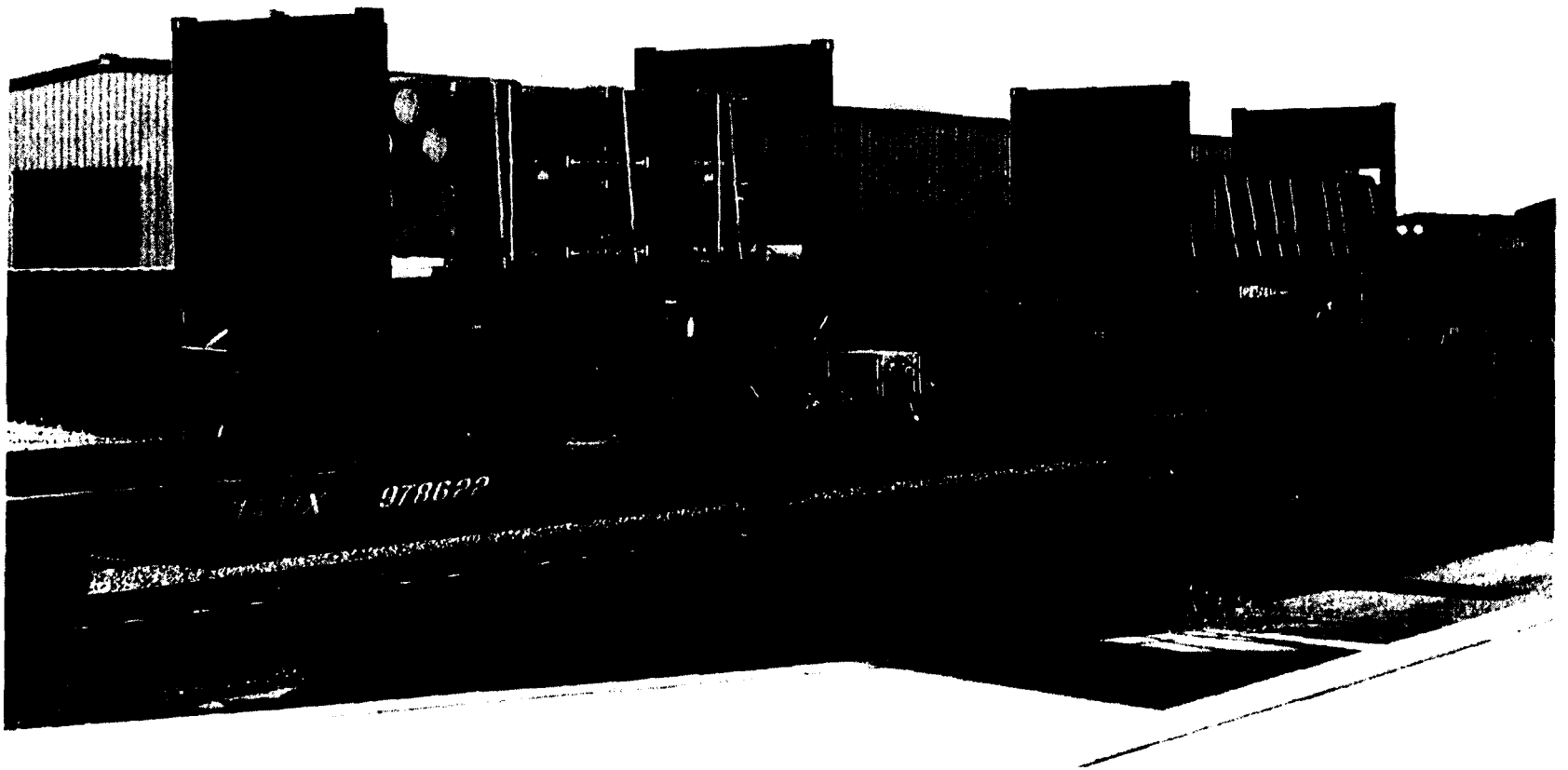
	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. SCN-94-113-1404. This photo shows the EPF with a load of 155mm SLPs. The flatrack is secured to the truck with steel pins. The pins are used only when a flatrack is being transported on the truck via rail. The truck is secured to the flatcar with six 5/8-inch wire ropes at each end.

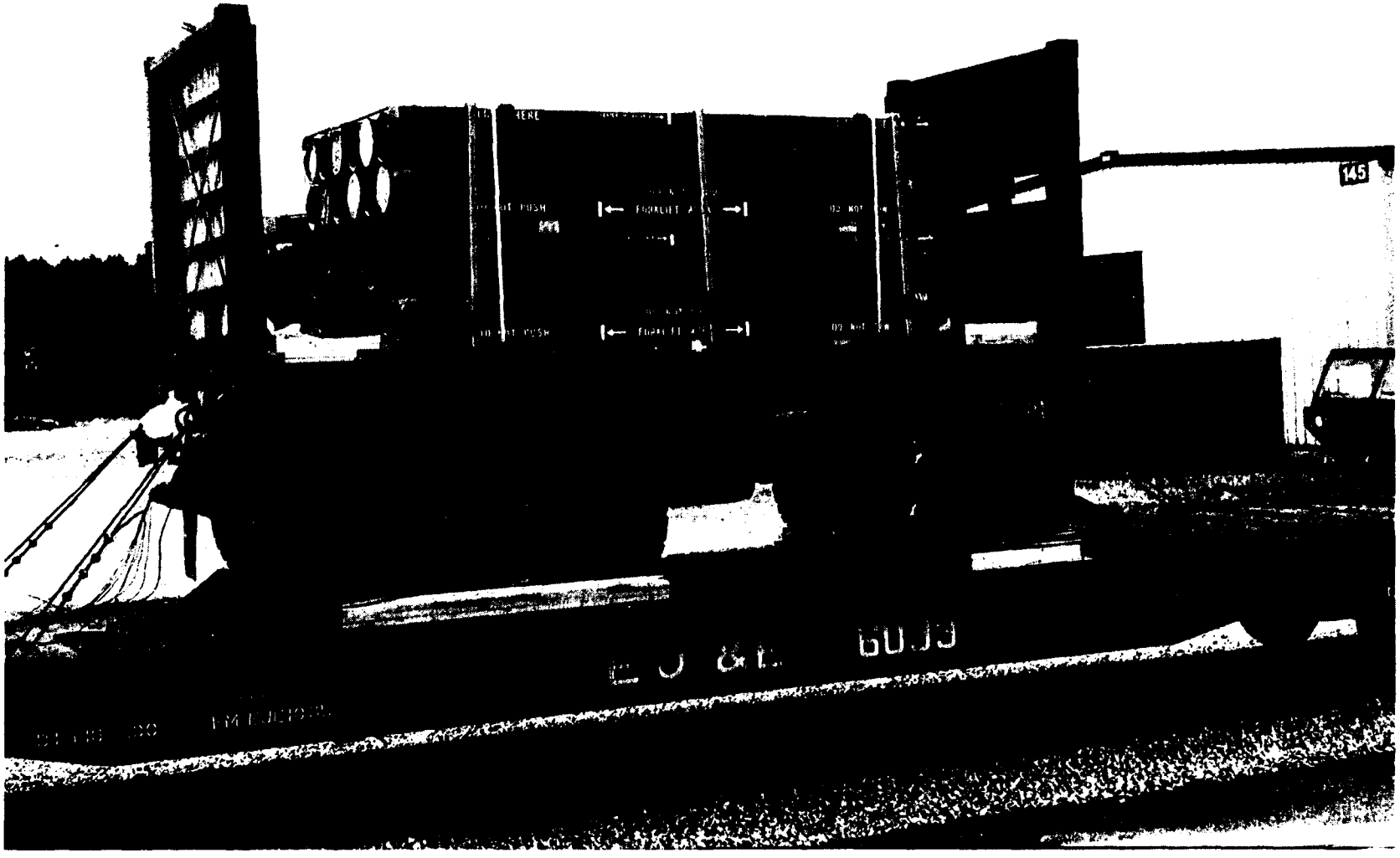


	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. SCN-94-113-1407. This photo shows the EPF with a load of PA116 120mm tank ammunition container metal pallets. The flatrack is secured to the truck with steel pins. The pins are used only when a flatrack is being transported on the truck via rail. The truck is secured to the flatcar with six 5/8-inch diameter wire ropes at each end.

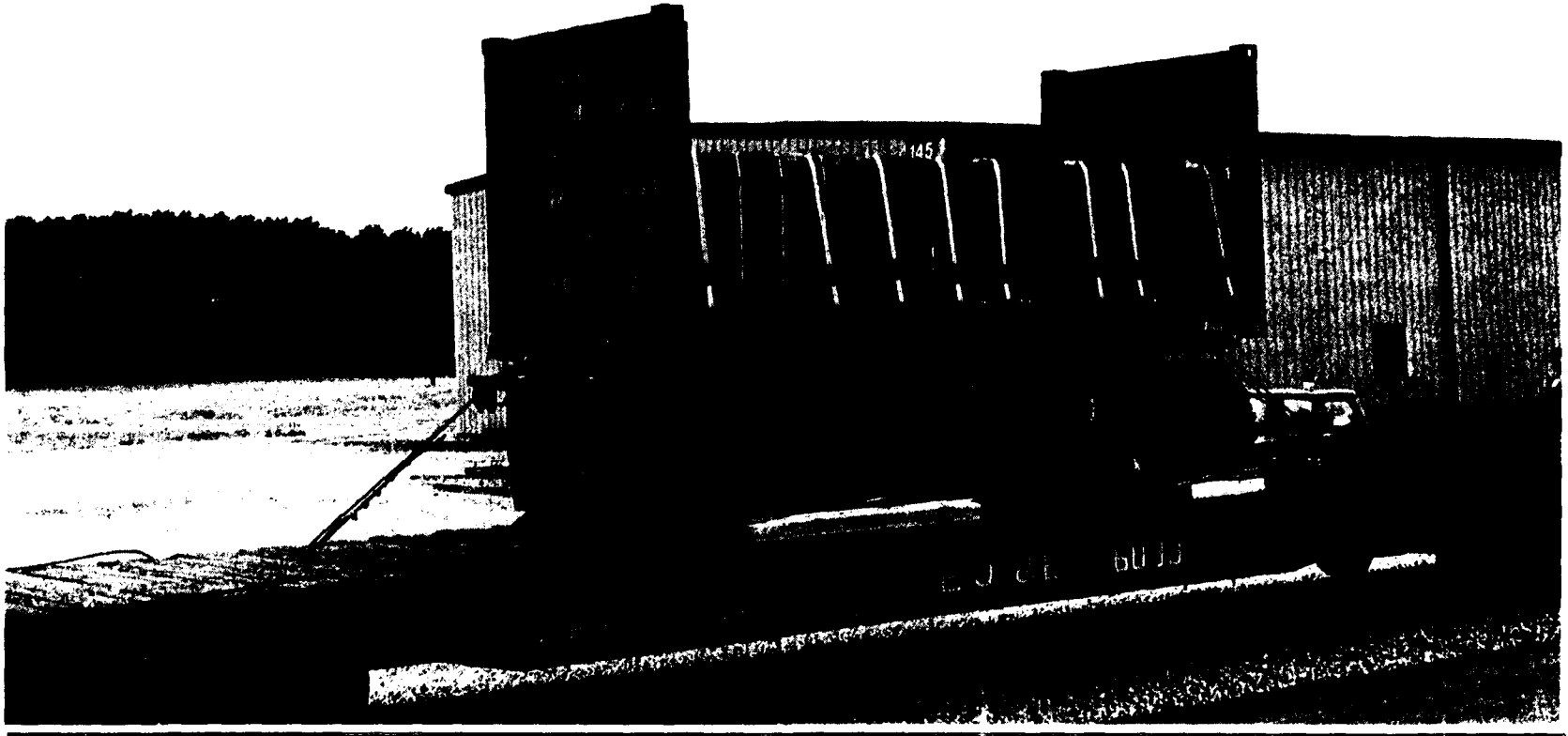


	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
Photo No. SCN-94-113-1412. The second part of the testing sequence included rail impact of the EPF mounted on a chassis which was mounted on a TOFC railcar. The following loads were being tested: a load of 155mm propelling charge containers and MLRS pods.		



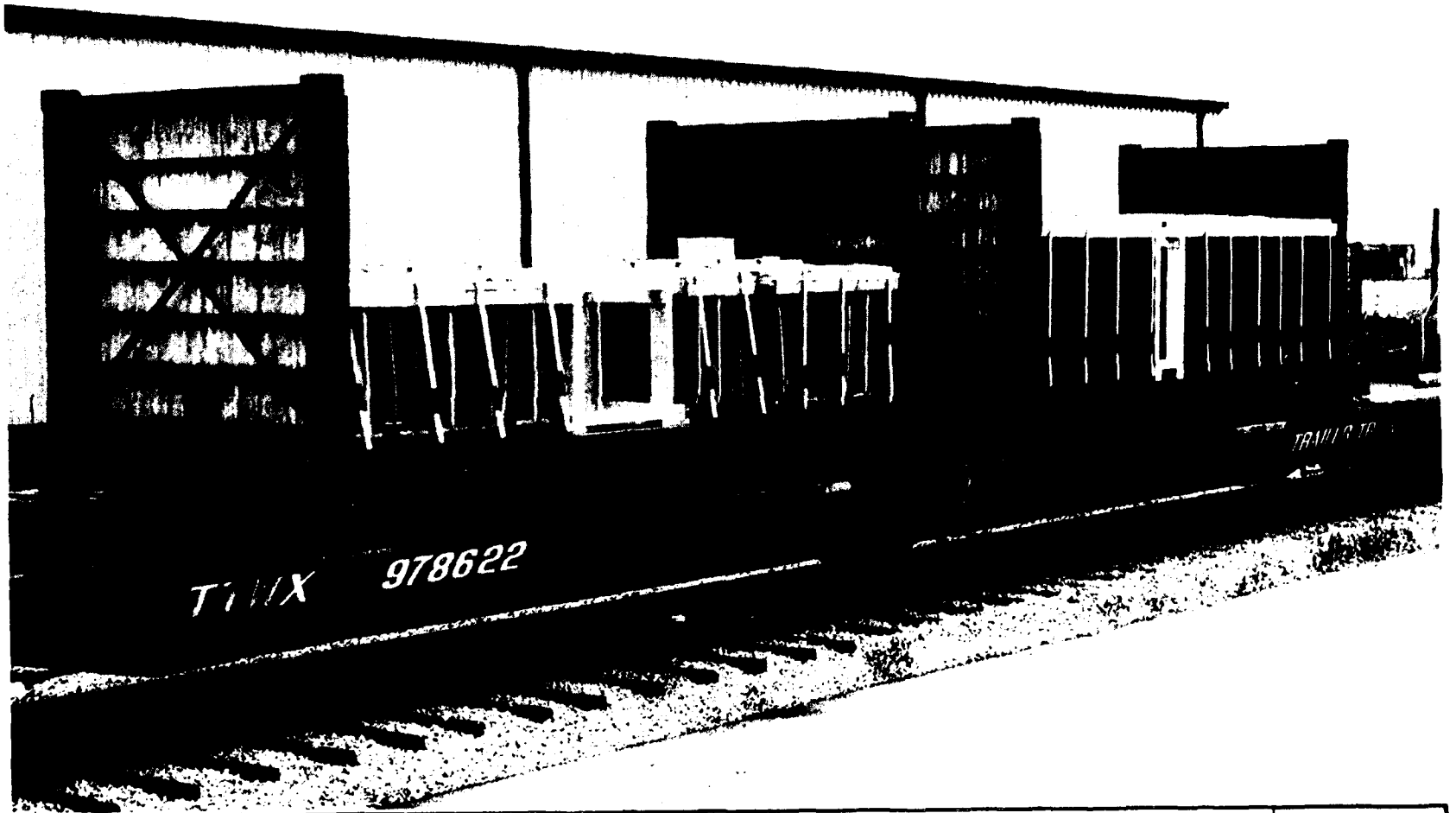
	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. SCN-94-113-1413. Phase three of testing included rail impact of each test load on the PLS trailer. The EPF is pinned to the trailer during rail transportation. The trailer is tied to the flatcar with two 5/8-inch wire ropes at each end. This load consists of MLRS pods.



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. SCN-94-113-1416. Phase three of testing included rail impact o[illegible] test load on the PLS trailer. The EPF is pinned to the trailer during rail transportation. The trailer is tied to the flatcar with two 5/8-inch wire ropes at each end. This load consists of 155mm propelling charge containers.

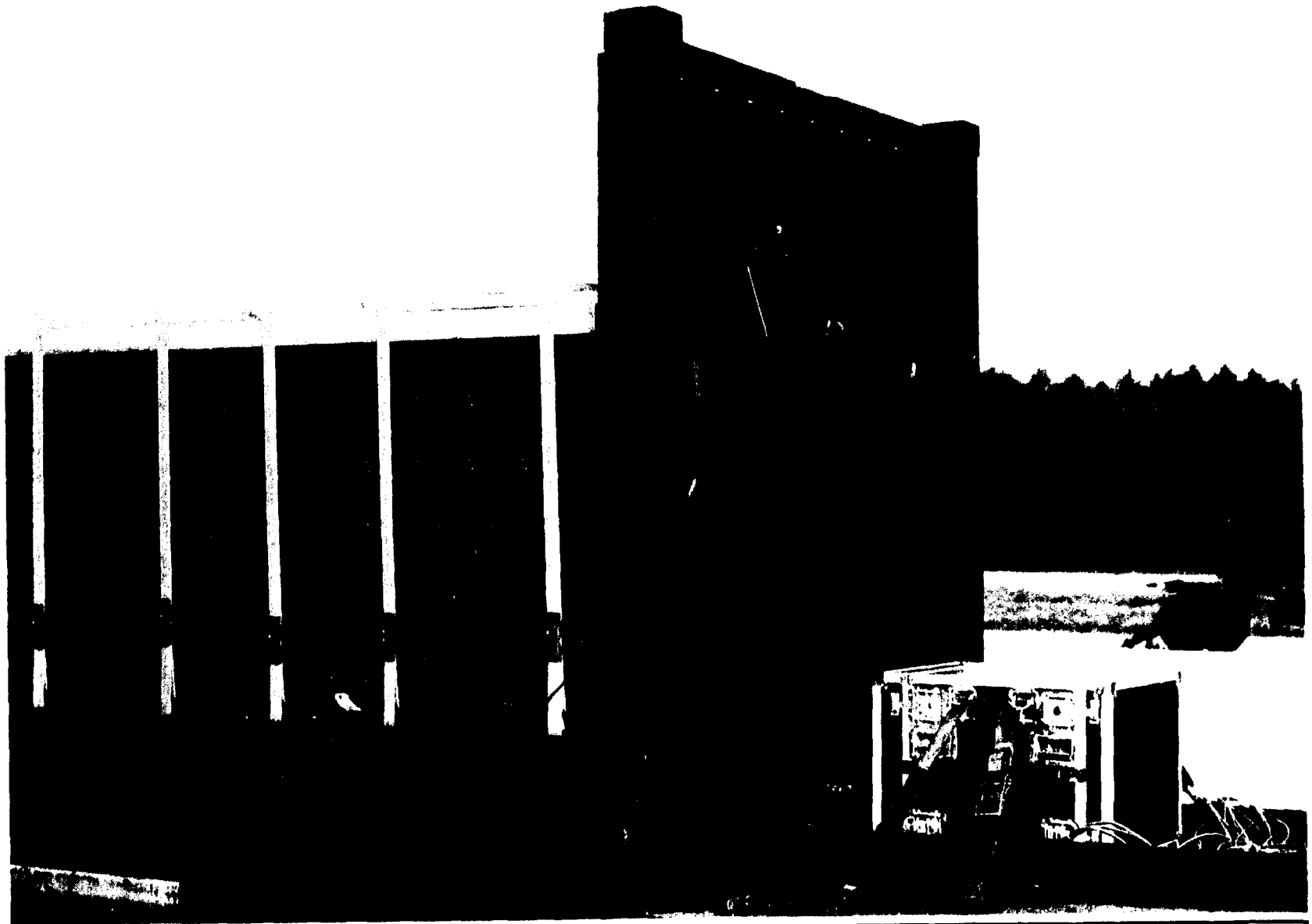


	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. A0317-SPN-94-020-407. This photo shows the first two EPFs mounted on a COFC railcar. The first load consists of 155mm SLPs and the second consists of PA116 120mm tank ammunition container metal pallets.



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
Photo No. A0317-SPN-94-020-408. This photo shows 155mm SLPs loaded onto an EPF.		



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	

Photo No. A0317-SPN-94-020-410. This photo shows a load of 155mm propelling charge containers. Instrumentation for recording measured acceleration is also shown.

PART 6

DRAWINGS

LOADING AND TIEDOWN PROCEDURES FOR CONVENTIONAL AMMUNITION ITEMS LOADED ON THE PALLETIZED LOADING SYSTEM (PLS) A-FRAME FLATRACK (M1077) AND/OR THE ISO COMPATIBLE PLS FLATRACK (IPF) (M1)

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U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND

APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND

U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL

DRAFTSMAN	TECHNICIAN	ENGINEER
B. LEONARD		J. SIMONS

VALIDATION ENGINEERING DIVISION	TRANSPORTATION ENGINEERING DIVISION	LOGISTICS ENGINEERING OFFICE

FEBRUARY 1994

CLASS	DIVISION	DRAWING	FILE
19	48	4903	CA1704

DO NOT SCALE

PROJECT CAP-TV 4-93

GENERAL NOTES

A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR-740-1.

B. THIS DRAWING COVERS PROCEDURES APPLICABLE TO THE TRANSPORT OF CONVENTIONAL AMMUNITION ITEMS, LOADED ON THE PALLETIZED LOADING SYSTEM (PLS) M1077 A-FRAME AND/OR M1 ISO COMPATIBLE FLATRACK, SECURED WITH WEB STRAP TIE-DOWN ASSEMBLIES, FOR ON AND/OR OFF HIGHWAY. NOTE: THE PROCEDURES ARE APPLICABLE WHETHER THE FLATRACKS MOVE ON THE PLS TRUCK OR ON THE PLS TRAILER.

C. DEPICTED PROCEDURES APPLY TO A-FRAME FLATRACKS HAVING AN ALL METAL CARGO DECK AREA 19'-0" LONG BY 7'-6-3/4" WIDE. EQUIPPED WITH ELEVEN TIEDOWN ANCHORS ON EACH SIDE AND FOUR ON EACH END. THE EMPTY FLATRACK WEIGHT IS 3,200 POUNDS AND THE LOAD CAPACITY IS 33,000 POUNDS. THE DEPICTED PROCEDURES ALSO APPLY TO THE M1 FLATRACK WHICH HAS A WOOD AND METAL CARGO DECK AREA 18'-8" LONG BY 7'-6-1/2" WIDE. EQUIPPED WITH ELEVEN TIEDOWN ANCHORS ON EACH SIDE. THE EMPTY FLATRACK WEIGHT IS 7.500 POUNDS AND THE LOAD CAPACITY IS 28,750 POUNDS.

D. ALL LOADS SHOWN HEREIN ARE TYPICAL AND ARE BASED ON TESTED PROCEDURES FOR OFF HIGHWAY TRANSPORT. COMBINATIONS OF PROCEDURES MAY BE USED. HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.

E. BECAUSE OF THE FACT THAT ALL LOADS HEREIN ARE TYPICAL IT IS MOST LIKELY THAT THE ACTUAL ITEM OR QUANTITY TO BE TRANSPORTED WILL NOT BE DEPICTED. IN ORDER TO MAINTAIN SIMILARITY FROM ONE LOAD TO ANOTHER, INSTALLATIONS SHOULD MAKE AN ACTUAL PENCILED SKETCH OF THE LOAD, USING THE VARIOUS TYPICAL LOADS AND PROCEDURES SHOWN HEREIN FOR GUIDANCE. THE SKETCH WOULD BE ADVANTAGEOUS FOR MAXIMUM LOADS USING A MINIMUM QUANTITY OF WEB STRAP TIEDOWN ASSEMBLIES.

F. WEB STRAP TIEDOWN ASSEMBLIES MUST BE SECURELY HOOKED INTO ANCHORING DEVICES ON THE TRANSPORTING VEHICLE AND FIRMLY TENSIONED. FIRMLY TENSIONED MEANS, WHEN THE OPERATOR PULLS ON THE RATCHET HANDLE BY HAND, THE RATCHET WILL NOT ADVANCE ANOTHER NOTCH. NO TYPE OF MECHANICAL EXTENSION OR LEVER WILL BE USED. EXERCISE CARE DURING STRAP APPLICATION. AVOID TWISTS IN THE STRAP TO THE EXTENT POSSIBLE (*IF TIME PERMITS*) BUT ENSURE THERE ARE NO KNOTS IN THE STRAP. ON THE TAKE-UP SPOOL OF THE RATCHET, ENSURE STRAIGHT LAY OF THE STRAP WHEN TENSIONING. AFTER INITIAL WEBBING-TO-WEBBING CONTACT HAS BEEN MADE, BY ROTATING THE TAKE-UP SPOOL UNTIL NO METAL ON THE SPOOL IS SHOWING AND THE STRAP HAS MADE CONTACT WITH ITSELF. THE TENSIONED STRAP MUST FORM AT LEAST 1/2 BUT NOT MORE THAN 1-1/2 WRAPS OF STRAP ON THE TAKE-UP SPOOL OF THE TENSIONING RATCHET. AFTER TENSIONING IS COMPLETED, ENSURE THAT THE SPOOL LOCKING LATCH IS FULLY SEATED AT BOTH ENDS OF THE SPOOL IN MATCHING LOCKING NOTCHES. TIE BACK THE LOOSE END OF THE STRAP AFTER TENSIONING IS COMPLETED (LOOSE ENDS MAY BE FOLDED AND TAPED OR TIED TO THE TENSIONING STRAP IF TIME PERMITS). FOR ADDITIONAL GUIDANCE, SEE "RATCHET/RATCHETING DETAILS" ON PAGES 42 AND 43.

G. ADJUSTABLE SCUFF SLEEVES PROVIDED ON WEB STRAP ASSEMBLIES WILL BE LOCATED TO PROVIDE A PAD WHERE STRAPS PASS OVER SHARP EDGES, OR RATCHETS AND HOOKS ON PREVIOUSLY INSTALLED WEB STRAP TIEDOWN ASSEMBLIES.

H. PROCEDURES DEPICTED HEREIN ARE TYPICAL IN NATURE RELATIVE TO ITEM LOCATION IN/ON THE FLATRACK AND THE QUANTITIES SHOWN. ITEM LOCATION AND QUANTITIES OF THE DESIGNATED ITEM MAY BE VARIED TO SATISFY OPERATIONAL REQUIREMENTS, PROVIDED LOADING AND TIEDOWN PRINCIPLES SPECIFIED HEREIN ARE RETAINED.

J. WHEN ONE WEB STRAP TIEDOWN ASSEMBLY IS NOT LONG ENOUGH TO SPAN THE DISTANCE DEPICTED, TWO ASSEMBLIES MAY BE HOOKED TOGETHER TO GAIN THE NECESSARY LENGTH.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

STRAP - - - - - - - -: WEBBING, UNIVERSAL TIEDOWN,
NSN 5340-01-204-3008, PN9392419, OR
NSN 5340-01-089-4997, PN11668588, OR
NSN 1670-00-725-1437, PN1376-013, OR
NSN 5340-00-980-9277, PN10900880.

ANTI-CHAFING MATERIAL - - - - - -: CANVAS, BURLAP, TAPE OR ANY OTHER SUITABLE MATERIAL.

(GENERAL NOTES CONTINUED)

K. AFTER ALL LOADING PROCEDURES ARE COMPLETE, CHECK ALL WEB STRAP TIEDOWN ASSEMBLIES FOR MAXIMUM TIGHTNESS AND RATCHET TIGHTER IF REQUIRED, PRIOR TO FOLDING UP AND SECURING THE LOOSE ENDS OF THE STRAP AS INSTRUCTED IN GENERAL NOTE "F".

L. DURING LONG HAULS THE WEB STRAPS SHOULD BE CHECKED AT ALL VEHICLE STOPS AND TIGHTENED IF NECESSARY.

M. DUE TO VARIOUS REASONS, SUCH AS ROUGH TERRAIN DURING OFF HIGHWAY TRANSPORT, PANIC STOPS, METAL FLOORS, AND NORMAL STRETCH OF WEB STRAPS, LOADED ITEMS MAY SLIDE SLIGHTLY LATERALLY AND/OR LONGITUDINALLY DURING TRANSPORT. THIS IS AN ACCEPTABLE CHARACTERISTIC AND IS NOT DETRIMENTAL TO LOAD SECUREMENT.

N. THE TIEDOWN METHODS WITHIN THIS DRAWING SHOW TWO STRAP HOOKS CONNECTED TO THE SAME TIEDOWN ANCHOR. THIS IS AUTHORIZED AS SPECIFIED HEREIN.

O. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

P. THROUGHOUT THIS PROCEDURAL DRAWING WHICH INCLUDES PROCEDURES FOR BOTH PALLETIZED UNITS AND SKIDDED UNITS, THE GUIDANCE SHOWN FOR ONE TYPE OF UNIT MAY ALSO BE USED FOR THE OTHER TYPE OF UNIT.

Q. EACH FLATRACK IS PROVIDED WITH 22 WEB STRAP TIEDOWN ASSEMBLIES. SIDE BOARD KITS AND CARGO COVERS ARE NOT PROVIDED, BUT ARE CONTAINED ON THE ADDITIONAL AUTHORIZED LIST (AAL) AND MAY BE OBTAINED THROUGH THE ARMY SUPPLY SYSTEM.

R. ONE M1 FLATRACK CAN BE LOADED ON AN M871 SEMITRAILER, AND TWO CAN BE LOADED ON AN M872 SEMITRAILER, USING THE FOUR BOTTOM ISO CORNER FITTINGS.

S. THE FLATRACK IS CAPABLE OF BEING TRANSPORTED ON C-130, C-141, C-5, AND C-17 AIRCRAFT.

T. THE FLATRACK IS CAPABLE OF BEING SLING-LIFTED BY A CH-47D HELICOPTER WITH A REDUCED PAYLOAD. THE MAXIMUM WEIGHT FOR SLING-LIFT IS 22,900 POUNDS.

U. FOR ADDITIONAL GUIDANCE SEE THE "LOADING PROCEDURES" ON PAGE 3 AND THE "SPECIAL NOTES" ON EACH LOAD PAGE.

LOADING PROCEDURES:

1. POSITION FULL AND/OR PARTIAL LOADS TIGHT AGAINST THE A-FRAME AT THE FORWARD END OF THE FLATRACK OR THE FRONT WALL ON THE M1 FLATRACK. IF DESIRED, PARTIAL LOADS MAY BE POSITIONED ANYWHERE ON THE LENGTH OF THE FLATRACK. HOWEVER, ONE MORE WEB STRAP TIEDOWN ASSEMBLY WILL BE REQUIRED. POSITION THIS STRAP FROM A TIEDOWN ANCHOR ON THE SIDE OF FLATRACK AROUND PALLET BASES ON FORWARD PALLETS, TO A TIEDOWN ANCHOR ON THE OPPOSITE SIDE OF THE FLATRACK.

2. PRIOR TO LOADING ITEMS ON THE FLATRACK ASSURE THAT THE DECK IS FREE OF EXCESSIVE AMOUNTS OF DIRT, SAND AND GRAVEL.

3. WHEN ATTACHING THE WEB STRAP HOOK TO THE TIEDOWN ANCHOR ON THE FLATRACK ASSURE THAT THE TIEDOWN ANCHOR IS IN A RAISED OR VERTICAL POSITION PRIOR TO AND AFTER THE STRAP IS TIGHTENED. IF THE WEB STRAP IS POSITIONED AT A NEAR HORIZONTAL ANGLE, SUCH AS STRAP MARKED ② ON PAGE 4, ASSURE THAT THE TIEDOWN ANCHOR IS POSITIONED IN LINE WITH THE PULL OF THE STRAP WHEN POSSIBLE. HOWEVER, IF TWO STRAPS ARE ATTACHED TO THE SAME TIEDOWN ANCHOR THE VERTICAL STRAP HAS PRECEDENCE.

4. ASSURE THAT ALL PALLET UNITS AND/OR OTHER ITEMS ARE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY AS LOADING PROGRESSES. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

5. DURING LONG HAULS, WHEN POSSIBLE, STRAPS SHOULD BE CHECKED DURING VEHICLE STOPS AND TIGHTENED, IF NECESSARY.

6. AFTER ALL LOADING PROCEDURES ARE COMPLETED, CHECK ALL WEB STRAPS FOR MAXIMUM TIGHTNESS AND RATCHET TIGHTER IF REQUIRED, PRIOR TO FOLDING UP AND TAPING THE LOOSE ENDS OF STRAPS AS INSTRUCTED IN GENERAL NOTE "F" ON PAGE 2.

7. BEFORE LOADING A PLS FLATRACK WITH AMMUNITION OR EXPLOSIVES, CHECK THE OVERALL CONDITION OF THE FLATRACK TO ENSURE IT IS SERVICEABLE. CHECK FOR CRACKS, BREAKS, DISTORTIONS, OR EXCESSIVE CORROSION WHICH WOULD MAKE USE OF THE FLATRACK UNSAFE. CHECK THE CARGO TIEDOWN ANCHORS AND THE FLATRACK TIEDOWN DEVICES TO ENSURE THEY ARE SERVICEABLE. MAKE SURE THEY ARE NOT CRACKED, BROKEN, BENT, DISTORTED OR EXCESSIVELY CORRODED TO PRECLUDE SAFE USE. GIVE SPECIAL ATTENTION WHILE CHECKING THE LIFTING DEVICE ON THE HOOKUP END OF THE PLS FLATRACK. MAKE SURE THE HOOKUP DEVICE IS NOT CRACKED, BROKEN, WORN, OR DISTORTED TO SUCH AN EXTENT SO AS TO MAKE THE DEVICE UNSERVICEABLE OR UNSAFE TO USE.

8. CHECK THE END WALLS ON THE M1 FLATRACK TO ASSURE THAT THEY CAN BE RAISED AND/OR LOWERED WITHOUT DIFFICULTY. FOLLOW THE MANUFACTURERS STEP-BY-STEP PROCEDURES FOR RAISING AND/OR LOWERING THE END WALLS AS SERIOUS INJURY OR DEATH TO PERSONNEL COULD RESULT DUE TO THE 1,700 POUND WEIGHT OF THE FRONT WALL AND THE 1,100 POUND WEIGHT OF THE REAR WALL.

9. BOTH FLATRACKS ARE EQUIPPED WITH ELEVEN TIEDOWN ANCHORS ALONG EACH SIDE. THE TIEDOWN ANCHORS AT EACH END AND IN THE CENTER HAVE A 25,000 POUND CAPACITY AND THE REMAINING EIGHT TIEDOWN ANCHORS HAVE A 10,000 POUND CAPACITY. ALL ELEVEN TIEDOWN ANCHORS WILL ACCEPT WEB STRAP TIEDOWN ASSEMBLIES OR STEEL STRAPPING.

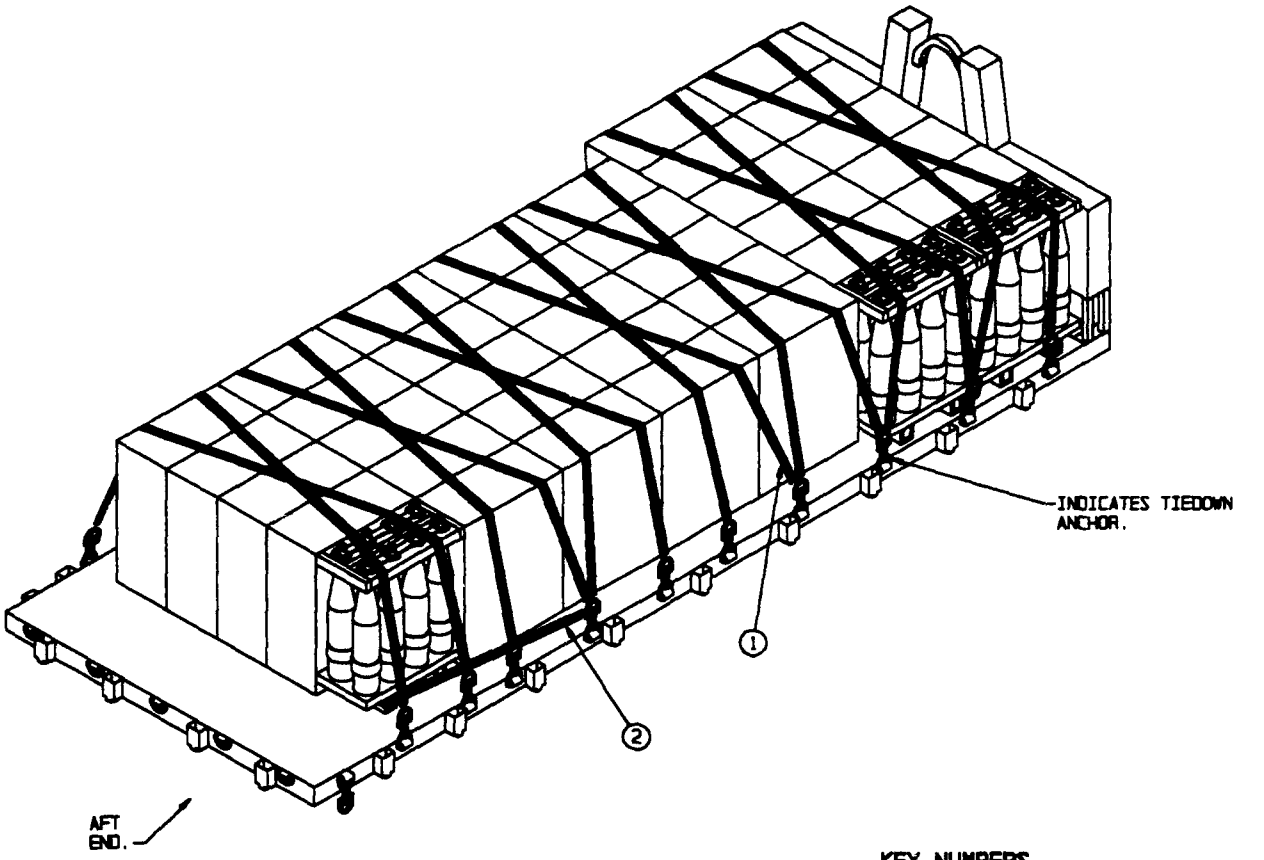
10. TWO SETS OF FORKLIFT POCKETS ARE PROVIDED UNDERNEATH THE A-FRAME AND M1 FLATRACK. THE SET NEAR THE ENDS OF THE FLATRACK MUST BE USED WHEN LIFTING LOADED FLATRACKS. THE SET CLOSEST TO THE CENTER OF THE FLATRACK IS FOR LIFTING UNLOADED FLATRACKS ONLY. USE OF THE WRONG FORKLIFT POCKETS COULD CAUSE DAMAGE TO EQUIPMENT. THE FORKS ON THE FORKLIFT MUST BE 70.00" LONG OR LONGER.

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NOTE ⊛ :

ALL LOADS LISTED IN THE INDEX ABOVE ARE DEPICTED ON THE A-FRAME FLATRACK WITH THE EXCEPTION OF THE LOADS ON PAGES 14, 15 AND 18 THROUGH 23 WHICH ARE DEPICTED ON THE M1 FLATRACK. DUE TO ITS SHORTER LENGTH AND REDUCED LOAD WEIGHT, THE M1 FLATRACK CANNOT ALWAYS BE LOADED WITH THE SAME QUANTITY OF AMMUNITION AS THE A-FRAME FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (14 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF A ROW OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 5.

② WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASE/SKID OF REAR ROW AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

TYPICAL AMMUNITION ITEM				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
D563	PROJ. 155MM. ICM. M483A1 14.62 L X 29.12 W X 39.38 H	296	37 PALLETS	32,338 LBS

SPECIAL NOTES:

1. A TYPICAL LOAD OF 37 PALLETS OF 155MM SLP IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-8-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. IF LOADING AN M1 FLATRACK HAVING A MAXIMUM LOAD WEIGHT OF 28,750 POUNDS, OMIT THE REARMOST ROW OF FIVE PALLETS. THIS WILL REDUCE THE LOAD QUANTITY FROM 37 PALLETS TO 32 PALLETS AND THE LOAD WEIGHT FROM 32,338 POUNDS TO 27,988 POUNDS. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE PALLET SHOWN IS TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE SLP PALLETS ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK POSITION ONE ROW OF SIX SLP PALLETS TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. POSITION A SECOND ROW OF SIX SLP PALLETS TIGHT AGAINST THE FIRST ROW. POSITION FIVE ROWS OF FIVE SLP PALLETS EACH TIGHT AGAINST EACH OTHER AND THE SECOND ROW OF SIX SLP PALLETS AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

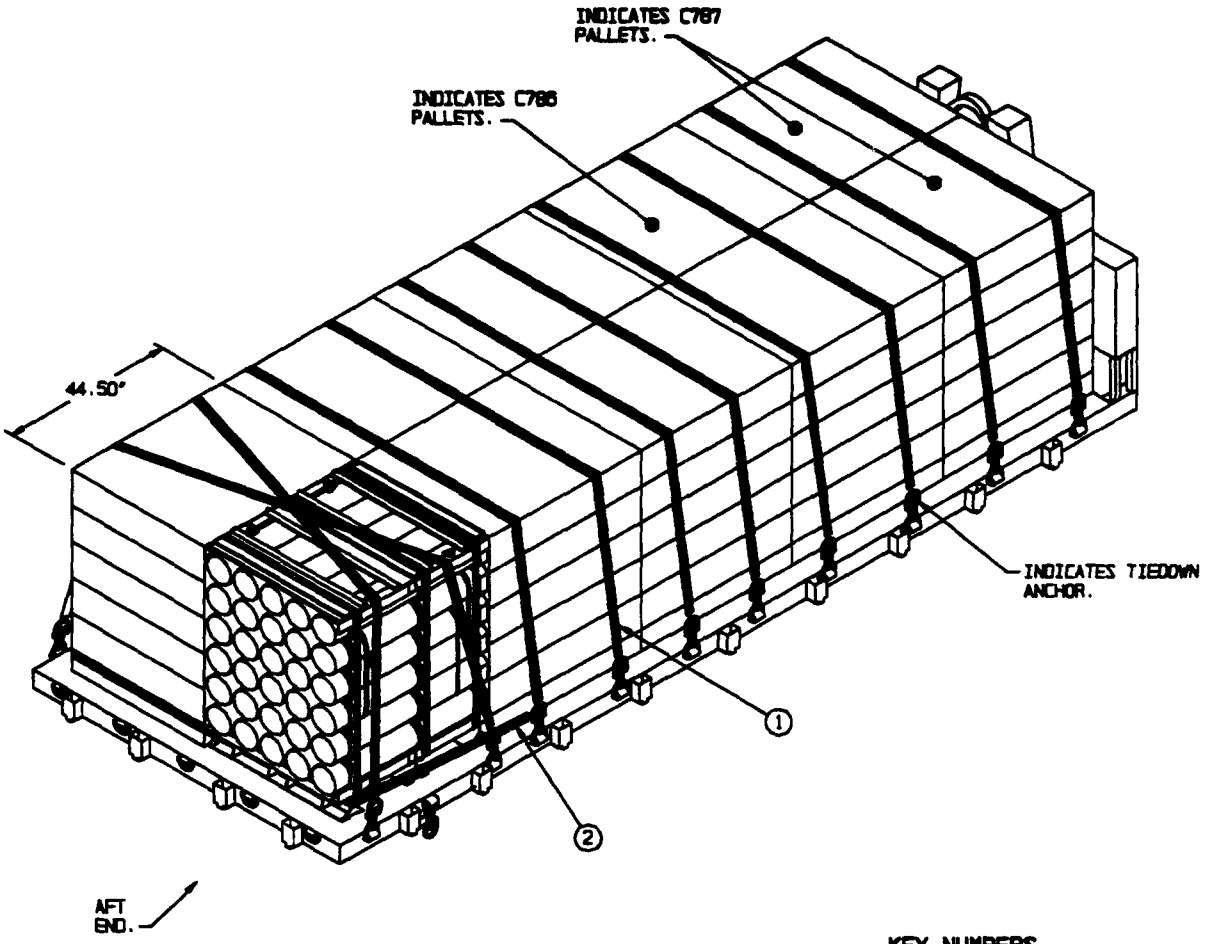
6. EACH LATERAL ROW OF ONE OR MORE PALLET UNITS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW. HOWEVER, THEY MUST BE POSITIONED TO THE INSIDE OF LIFTING RING ON THE NOSE END OF THE END PROJECTILES, OF EACH PALLET UNIT ON THE END OF A ROW. AS SHOW IN THE LOAD ON PAGE 4. THIS WILL ASSURE THAT THERE ARE TWO STRAPS OVER EACH ROW. THE LIFTING RING WILL ALSO HELP TO KEEP THE STRAP IN POSITION.

7. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

8. A TOTAL OF FIFTEEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
155MM SLP PLT	37	32,338 LBS



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (10 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 8 ON PAGE 7.

② WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

120MM COMBAT CONFIGURED LOAD				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
C786	120MM COMP RD APFSDS-T 39.50 L X 44.50 W X 51.50 H	240	8 PALLETS	19,128 LBS
C787	120MM COMP RD HEAT-MP-T 40.13 L X 44.50 W X 51.75 H	60	2 PALLETS	4,866 LBS

SPECIAL NOTES:

1. A TYPICAL 120MM COMBAT CONFIGURED LOAD FOR ARMOR IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-8-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. IF LOADING AN M1 FLATRACK HAVING A CARGO DECK 18'-8" LONG, POSITION THE TWO REARMOST PALLETS WITH THE 39.5" DIMENSION PARALLEL TO THE SIDE OF THE FLATRACK IN LIEU OF THE 44.5" DIMENSION. THIS WILL REDUCE THE LOAD LENGTH FROM 18'-8-1/2" LONG TO 18'-1-1/2" LONG. SEE GENERAL NOTE "C" ON PAGE 2.

3. IF FAST UNLOADING OF ROUNDS FROM THE PALLETIZED CONTAINERS IS DESIRED, USE THE PROCEDURES SHOWN FOR THE 105MM COMPLETE ROUNDS IN THE PA117 CONTAINER, ON PAGES 8 AND 9.

4. THE PALLETS SHOWN ARE TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

5. PRIOR TO LOADING THE 120MM PALLETS ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

6. WHEN LOADING THE FLATRACK POSITION THE LOAD TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

7. IF DESIRED, THE 120MM PALLETS MAY BE POSITIONED WITH THE 39.5" DIMENSION PARALLEL TO THE SIDES OF THE FLATRACK.

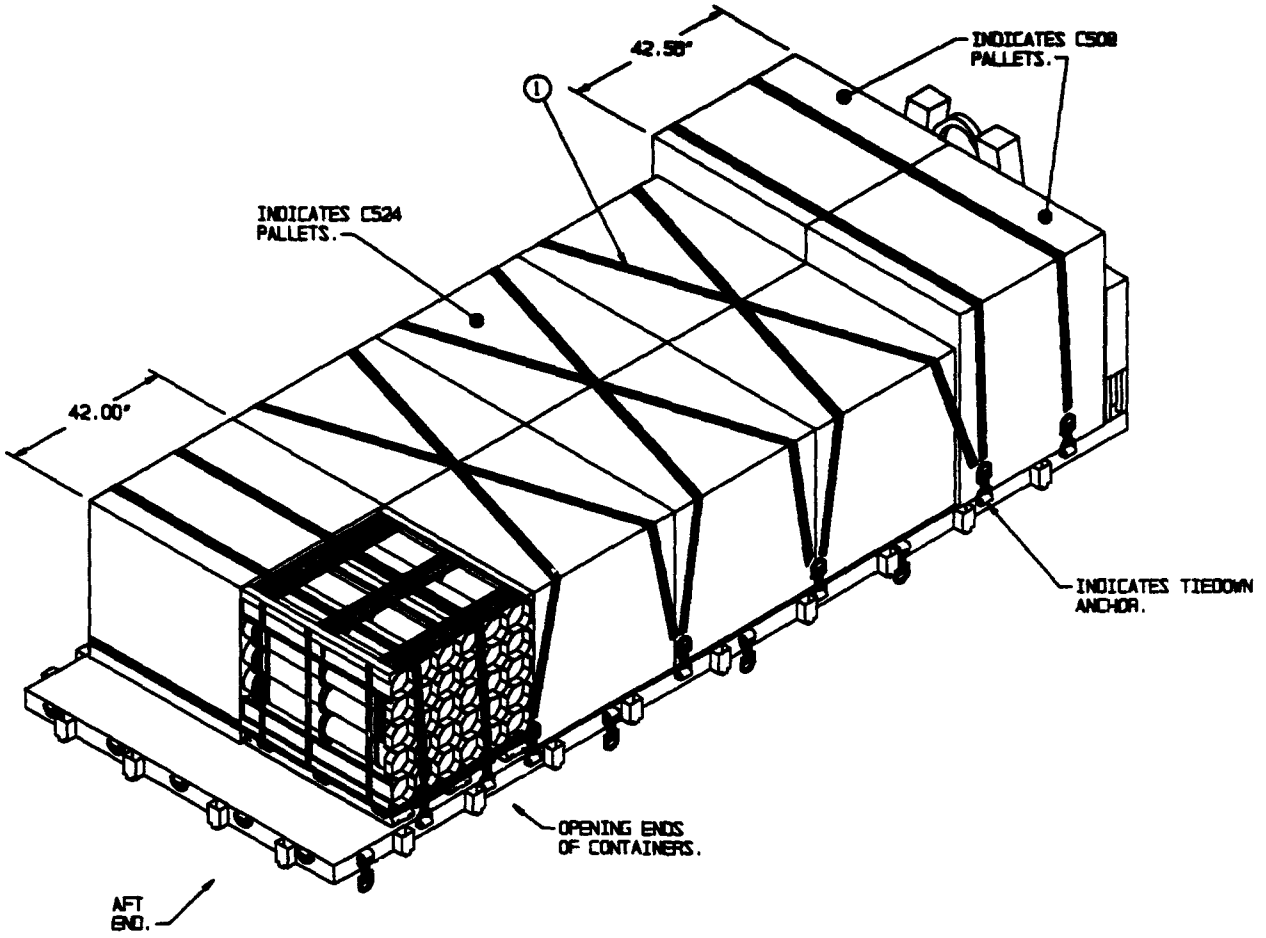
8. EACH LATERAL ROW OF TWO 120MM PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW.

9. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

10. A TOTAL OF ELEVEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
120MM PALLET	10	23,994 LBS



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (8 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 8 ON PAGE 9.

② WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

105MM COMBAT CONFIGURED LOAD				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
C524	105MM COMP RD APFSDS-T 42.75 L X 44.50 W X 40.38 H	240	8 PALLETS	15,352 LBS
C508	105MM COMP RD HEAT 45.81 L X 42.56 W X 40.41 H	60	2 PALLETS	4,388 LBS

105MM COMBAT CONFIGURED LOAD FOR ARMOR

SPECIAL NOTES:

1. A TYPICAL 105MM COMBAT CONFIGURED LOAD FOR ARMOR IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-8-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. THE PROCEDURES SHOWN ON PAGE 8 MAY BE USED FOR FAST UNLOADING OF THE COMPLETE ROUNDS FROM THE PALLETIZED CONTAINERS WITHOUT REMOVING THE PALLETS OR CONTAINERS FROM THE FLATRACK. LOOSEN THE TWO STRAPS MARKED ① FOR ACCESS TO ALL CONTAINERS. AFTER COMPLETE ROUNDS ARE REMOVED RATCHET STRAPS MARKED ① TIGHT TO SECURE THE PALLETS.

3. THE LOAD AS SHOWN ON PAGE 8 MAY ALSO BE LOADED ON AN M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

4. THE PALLETS SHOWN ARE TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

5. PRIOR TO LOADING THE 105MM PALLETS ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

6. WHEN LOADING THE FLATRACK POSITION THE LOAD TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

7. IF RAPID UNLOADING IS NOT REQUIRED, THE 105MM PALLETS MAY BE POSITIONED WITH THE 44.50" AND 45.81" DIMENSION PARALLEL TO THE SIDES OF THE FLATRACK.

8. EACH LATERAL ROW OF TWO 105MM PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW.

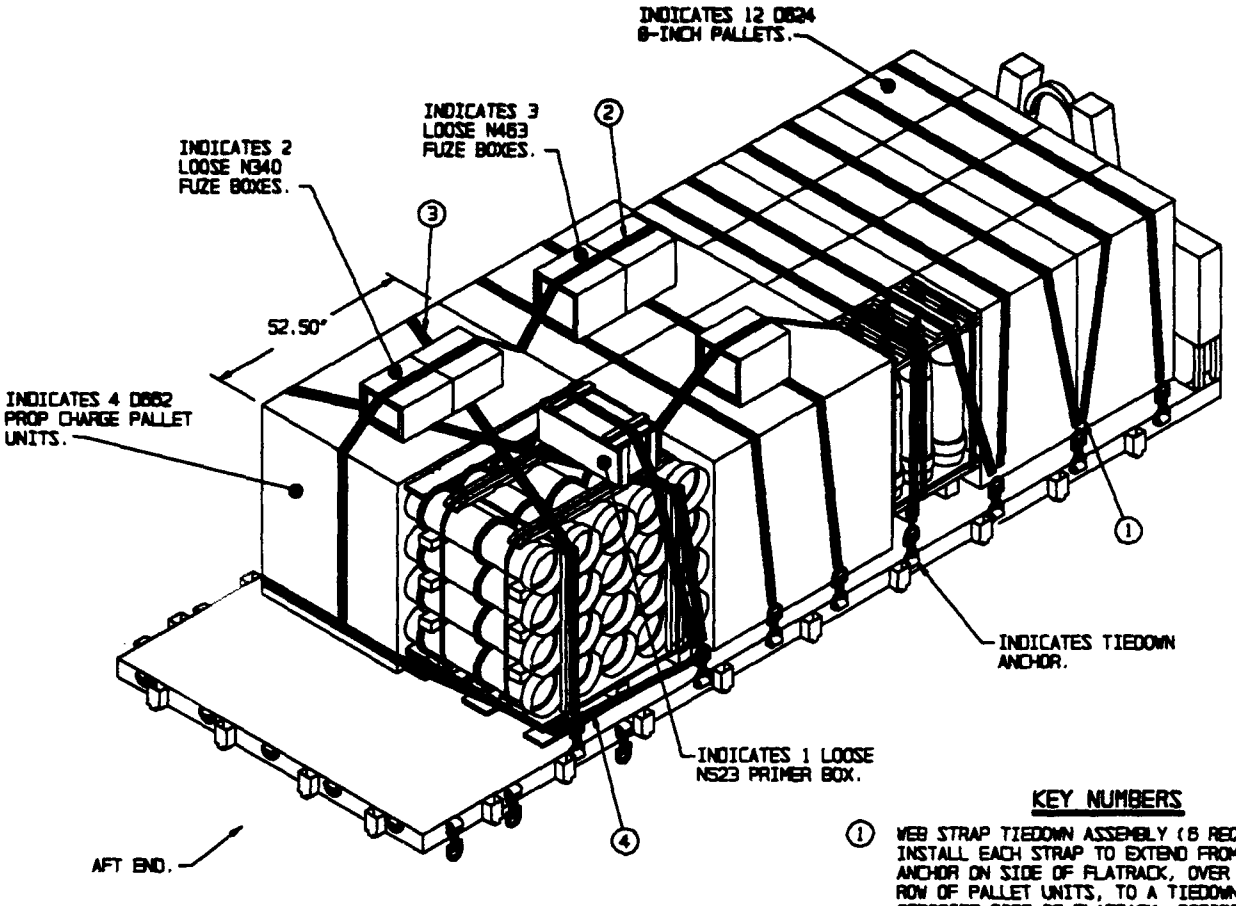
9. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

10. NOTE THAT THE TWO PALLETS OF C5OB AT THE FORWARD END OF THE LOAD EXCEED THE FLATRACK CARGO DECK WIDTH BY 1.12" AND MAY PREVENT THE USE OF THE FLATRACK SIDE WALLS. IF DESIRED, THE TWO C5OB PALLETS MAY BE POSITIONED AT THE AFT END OF THE FLATRACK WITH THE 45.81" DIMENSION PARALLEL TO THE SIDES OF THE FLATRACK. THIS WOULD STILL ALLOW RAPID UNLOADING BUT ACCESS WOULD BE FROM THE AFT END OF THE FLATRACK IN LIEU OF THE SIDE.

11. A TOTAL OF ELEVEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
105MM PALLET	10	19,482 LBS



ISOMETRIC VIEW

8-INCH COMBAT CONFIGURED LOAD				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
D862	PROP CHG, 8-INCH 52.50 L X 40.75 W X 48.50 H	80	4 PALLETS	8,952 LBS
D624	PROJ, 8-INCH, M650 19.37 L X 28.50 W X 45.62 H	72	12 PALLETS	15,036 LBS
N340	FUZE, M739 14.63 L X 12.81 W X 8.56 H	32	2 BOXES	92 LBS
N463	FUZE, M728 14.63 L X 12.75 W X 12.00 H	48	3 BOXES	142 LBS
N523	PRIMER, M82 24.13 L X 12.00 W X 11.25 H	500	1 BOX	37 LBS

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (6 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF A ROW OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 11.

② WEB STRAP TIEDOWN ASSEMBLY (4 REQD). PRE-POSITION EACH STRAP UNDER TOP DECK OF PALLET BASE AT LOCATION DESIRED PRIOR TO POSITIONING PALLETS TIGHT AGAINST EACH OTHER. AFTER STRAPS MARKED ③ ARE INSTALLED AND RATCHETED TIGHT POSITION LOOSE BOXES ON TOP OF PALLET UNITS. BRING ENDS OF STRAPS MARKED ② UP OVER TOP OF LOOSE BOXES AND HOOK ENDS OF STRAP TOGETHER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. DO NOT POSITION THESE STRAPS OVER TOP OF LOOSE BOXES. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 11.

④ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASE OF REAR PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

SPECIAL NOTES:

1. A TYPICAL 8-INCH COMBAT CONFIGURED LOAD FOR FIELD ARTILLERY IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 39,000 POUNDS.

2. THE LOAD AS SHOWN ON PAGE 10 MAY ALSO BE LOADED ON THE M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE LOAD SHOWN IS TYPICAL ONLY. IF LOADING UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE SLP AND PROPELLING CHARGE PALLETS ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK POSITION THREE ROWS OF FOUR SLP PALLETS TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. POSITION TWO ROWS OF TWO PROP CHARGE PALLETS TIGHT AGAINST THE SLP PALLETS AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. POSITION LOOSE BOXES OF FUZES AND PRIMERS ON TOP OF PALLET UNITS AS LOADING PROGRESSES.

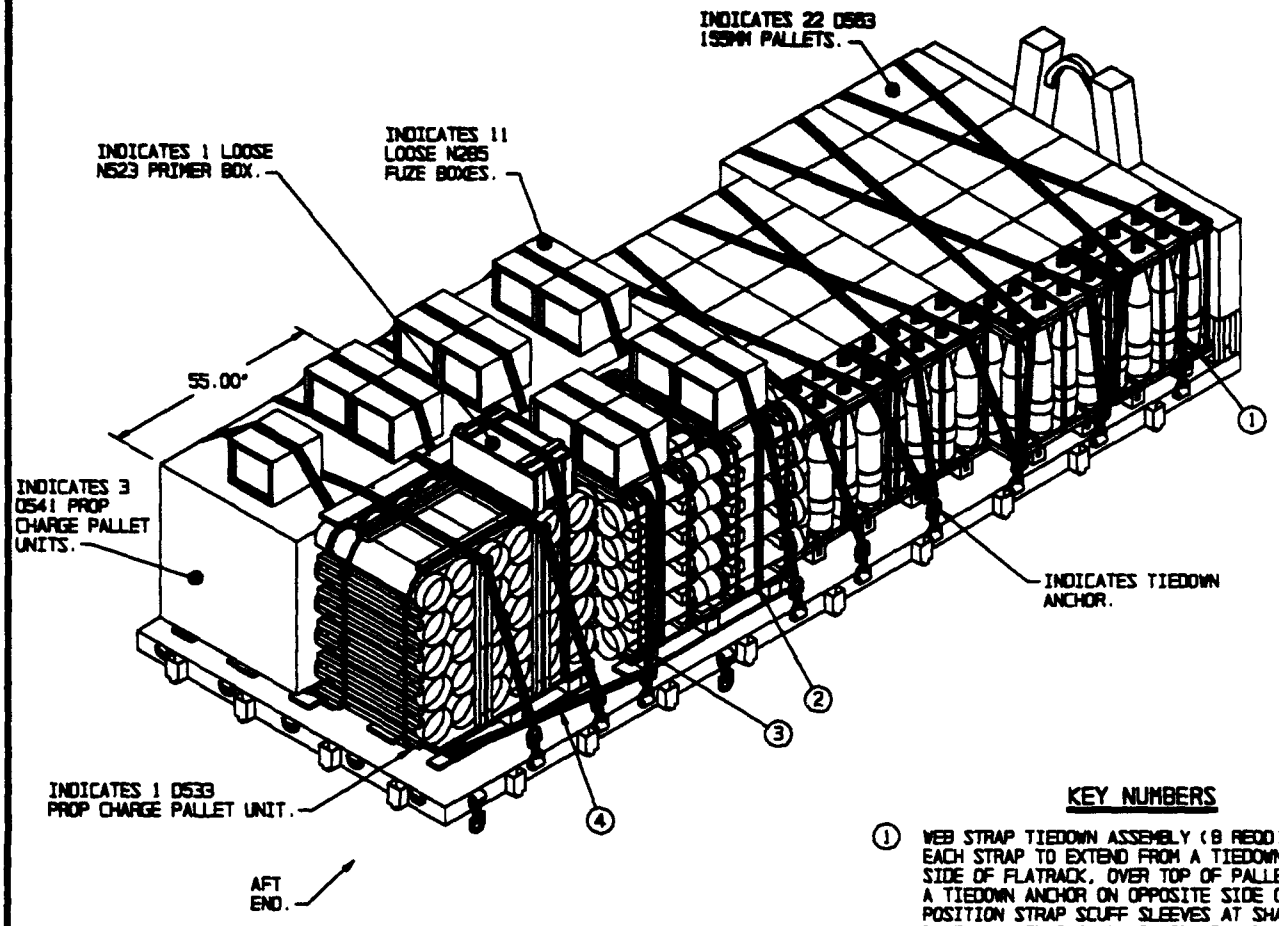
6. EACH LATERAL ROW OF ONE OR MORE PALLET UNITS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW. THESE STRAPS MUST NOT BE POSITIONED OVER TOP OF THE LOOSE BOXES.

7. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

8. A TOTAL OF FIFTEEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
8-INCH CCL	1	22,250 LBS



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (8 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 13.

② WEB STRAP TIEDOWN ASSEMBLY (7 REQD). PRE-POSITION EACH STRAP UNDER TOP DECK OF PALLET AT LOCATION DESIRED PRIOR TO POSITIONING PALLETS TIGHT AGAINST EACH OTHER. POSITION LOOSE BOXES ON TOP OF PALLET UNITS. NOTE: IF ANY STRAPS MARKED ③ HAVE TO BE POSITIONED UNDER LOOSE BOXES DO SO AT THIS TIME. BRING ENDS OF STRAPS MARKED ② UP OVER TOP OF LOOSE BOXES AND HOOK ENDS TOGETHER, POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. DO NOT POSITION THESE STRAPS OVER TOP OF LOOSE BOXES. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 13.

④ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

155MM COMBAT CONFIGURED LOAD

DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
D533	PROP CHG. 155MM, WB M119 45.50 L X 35.75 W X 49.00 H	30	1 PALLET	1,582 LBS
D541	PROP CHG. 155MM, WB M4 55.00 L X 40.00 W X 44.88 H	150	3 PALLETS	5,298 LBS
D563	PROJ. 155MM, ICM, M483A1 14.62 L X 29.12 W X 39.38 H	176	22 PALLETS	19,228 LBS
N285	FUZE, MTSQ, M577 14.63 L X 12.75 W X 9.18 H	176	11 BOXES	600 LBS
N523	PERCUSSION PRIMER, M82 24.13 L X 12.00 W X 11.25 H	500	1 BOX	62 LBS

SPECIAL NOTES:

1. A TYPICAL 155MM COMBAT CONFIGURED LOAD FOR FIELD ARTILLERY IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. IF LOADING AN M1 FLATRACK HAVING A CARGO DECK 18'-6" LONG, TURN THE REARMOST PALLET OF 155MM PROP CHARGES (0541) 90° SO THE 40" DIMENSION IS PARALLEL TO THE SIDE OF THE FLATRACK IN LIEU OF THE 55" DIMENSION. THIS WILL REDUCE THE LOAD LENGTH FROM 18'-10-1/2" TO 18'-1" LONG. NOTE: THE WIDTH OF THESE TWO PALLETS COMBINED WILL BE 7'-6-3/4". SEE GENERAL NOTE "C" ON PAGE 2.

3. THE LOAD SHOWN IS TYPICAL ONLY. IF LOADING UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE SLP AND PROPELLING CHARGE PALLETS ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK POSITION TWO ROWS OF SIX SLP PALLETS TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. POSITION TWO ROWS OF FIVE SLP PALLETS TIGHT AGAINST THE LAST ROW OF 6 PALLETS AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. POSITION TWO ROWS OF TWO PROP CHARGE PALLETS TIGHT AGAINST THE SLP PALLETS AND CENTERED ACROSS THE WIDTH OF THE FLATRACK, THEN POSITION ONE PROP CHARGE PALLET TIGHT AGAINST THE LOAD. POSITION LOOSE BOXES OF FUZES AND PRIMERS ON TOP OF PALLET UNITS AS LOADING PROGRESSES.

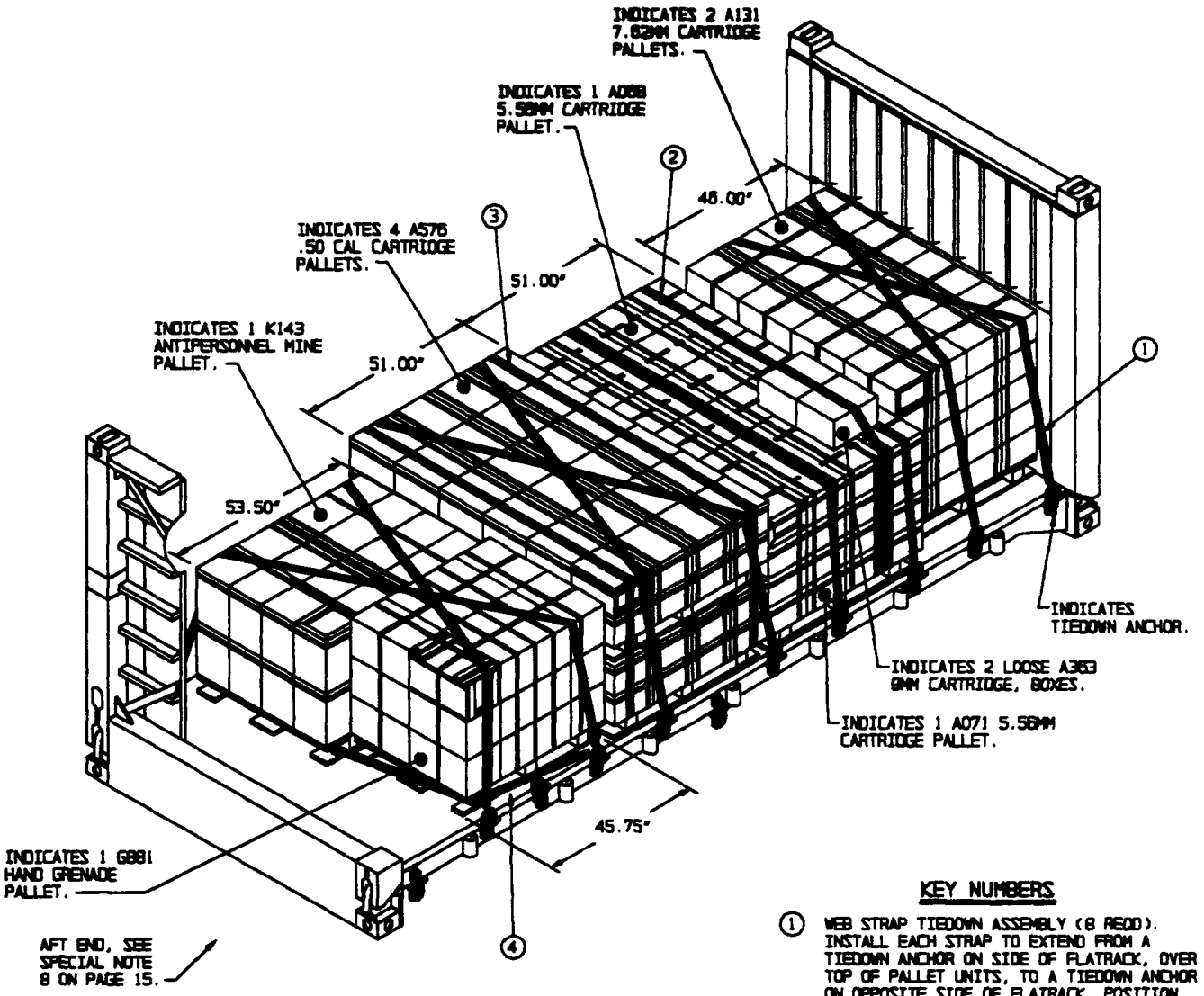
6. EACH LATERAL ROW OF ONE OR MORE PALLET UNITS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW. THESE STRAPS MUST NOT BE POSITIONED OVER TOP OF THE LOOSE BOXES.

7. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

8. A TOTAL OF TWENTY WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
155MM CCL	1	26,750 LBS



ISOMETRIC VIEW

SMALL ARMS COMBAT CONFIGURED LOAD				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
A131	7.62MM CARTRIDGE, LKD 4/1 46.00 L X 35.00 W X 46.12 H	64,000	2 PALLETS	6,352 LBS
A088	5.56MM CARTRIDGE, TRACER 51.00 L X 43.50 W X 39.00 H	78,720	1 PALLET	3,016 LBS
A071	5.56MM CARTRIDGE, BALL 51.00 L X 43.50 W X 39.00 H	80,640	1 PALLET	3,388 LBS
A576	.50 CAL CARTRIDGE LKD 4/1 51.00 L X 43.50 W X 22.25 H	19,200	4 PALLETS	8,408 LBS
G881	HAND GRENADE, FRAG 45.75 L X 37.87 W X 39.25 H	720	1 PALLET	1,309 LBS
K143	MINE, ANTIPERSONNEL 53.50 L X 42.25 W X 35.75 H	192	1 PALLET	1,808 LBS
A363	9MM CARTRIDGE, BALL 14.43 L X 12.53 W X 8.12 H	4,000	2 BOXES	160 LBS

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (8 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 5 ON PAGE 15.

② WEB STRAP TIEDOWN ASSEMBLY (1 REQD). PRE-POSITION STRAP UNDER TOP DECK OF PALLET AT LOCATION DESIRED PRIOR TO POSITIONING PALLETS TIGHT AGAINST EACH OTHER. POSITION LOOSE BOXES ON TOP OF PALLET UNIT. BRING ENDS OF STRAP UP OVER TOP OF LOOSE BOXES AND HOOK ENDS TOGETHER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). HOOK TWO STRAPS TOGETHER AND ENCIRCLE ALL FOUR .50 CAL (A576) PALLETS AT TWO PLACES. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

④ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

SMALL ARMS, COMBAT CONFIGURED LOAD FOR INFANTRY

SPECIAL NOTES:

1. A TYPICAL SMALL ARMS COMBAT CONFIGURED LOAD FOR INFANTRY IS SHOWN LOADED ON THE M1 FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 18'-8" LONG AND A MAXIMUM LOAD WEIGHT OF 20,750 POUNDS.

2. THE LOAD AS SHOWN ON PAGE 14 MAY ALSO BE LOADED ON AN A-FRAME FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE LOAD SHOWN IS TYPICAL ONLY. IF LOADING UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE SMALL ARMS PALLETS ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE FORWARD END WALL AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

6. EACH LATERAL ROW OF ONE OR MORE PALLET UNITS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW. THESE TWO STRAPS MUST NOT BE POSITIONED OVER TOP OF LOOSE BOXES.

7. ALL PALLETS MUST BE POSITIONED TIGHT AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

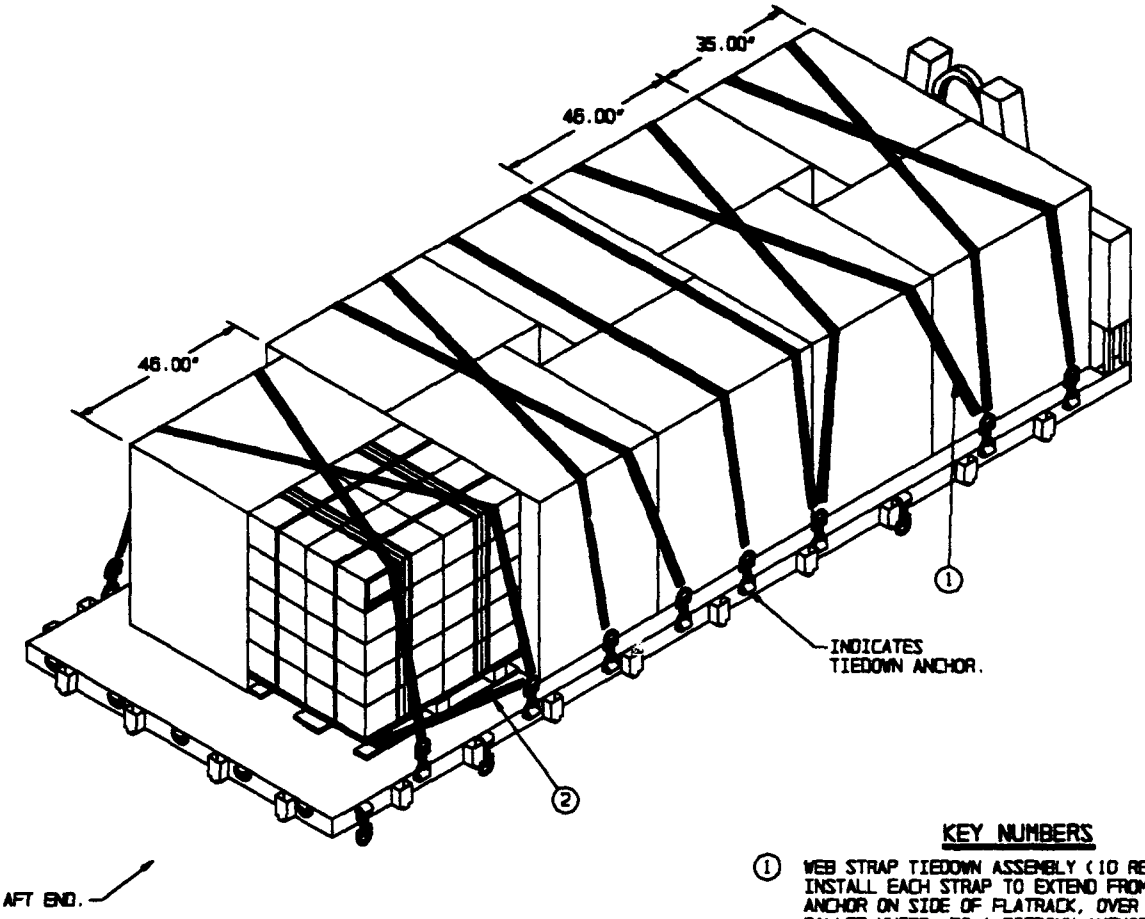
8. ONLY A PARTIAL AFT END WALL IS SHOWN ON THE ISOMETRIC VIEW TO PREVENT DISTRACTION OF THE LOADING AND TIEDOWN PROCEDURES AND TO IMPROVE THE CLARITY OF THE DEPICTED PROCEDURES.

9. A TOTAL OF FOURTEEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
SMALL ARMS CCL	1	24,451 LBS

SMALL ARMS, COMBAT CONFIGURED LOAD FOR INFANTRY



ISOMETRIC VIEW

KEY NUMBERS

(1) WEB STRAP TIEDOWN ASSEMBLY (10 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 17.

(2) WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR ROW AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

TYPICAL AMMUNITION ITEM				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
A131	7.62MM CTG 46.00 L X 35.00 W X 46.12 H	320,000	10 PALLETS	31,810 LBS

SPECIAL NOTES:

1. A TYPICAL CHIMNEY PATTERN LOAD OF 10 PALLETS OF 7.62MM CARTRIDGES IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. IF LOADING AN M1 FLATRACK HAVING A MAXIMUM LOAD WEIGHT OF 28,750 POUNDS, OMIT ONE PALLET FROM AFT END. THIS WILL REDUCE THE LOAD QUANTITY TO 9 PALLETS AND THE LOAD WEIGHT TO 28,620 POUNDS. SEE GENERAL NOTE "C" ON PAGE 2. GENERAL NOTE "C" ON PAGE 2.

3. A CHIMNEY PATTERN LOAD MAY BE USED TO REDUCE THE LOAD LENGTH AND/OR INCREASE THE LOAD QUANTITY. FOR EXAMPLE, IF THE PALLETS SHOWN IN THE LOAD ON PAGE 16 WERE POSITIONED TWO WIDE AND FOUR LONG WITH THE 48.00" DIMENSION PARALLEL TO THE SIDE OF THE FLATRACK THERE WOULD BE ENOUGH ROOM AT THE AFT END TO POSITION ONE MORE PALLET WITH THE 35.00" DIMENSION PARALLEL TO THE SIDE OF THE FLATRACK FOR A MAXIMUM LOAD OF NINE PALLETS. HOWEVER, BY POSITIONING EIGHT PALLETS IN A CHIMNEY PATTERN ENOUGH SPACE IS GAINED TO POSITION TWO MORE PALLETS AT THE AFT END FOR A LOAD QUANTITY OF TEN PALLETS. NOTE: WHEN LOADING PALLETS IN A CHIMNEY PATTERN THE PALLET LENGTH PLUS THE PALLET WIDTH MUST NOT EXCEED THE CARGO DECK WIDTH OF THE FLATRACK (REF: 7'-6-1/2"). FOR AN ALTERNATIVE METHOD SEE THE LOAD ON PAGES 24 AND 25.

4. THE PALLET SHOWN IS TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

5. PRIOR TO LOADING THE 7.62MM CARTRIDGE PALLETS ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

6. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

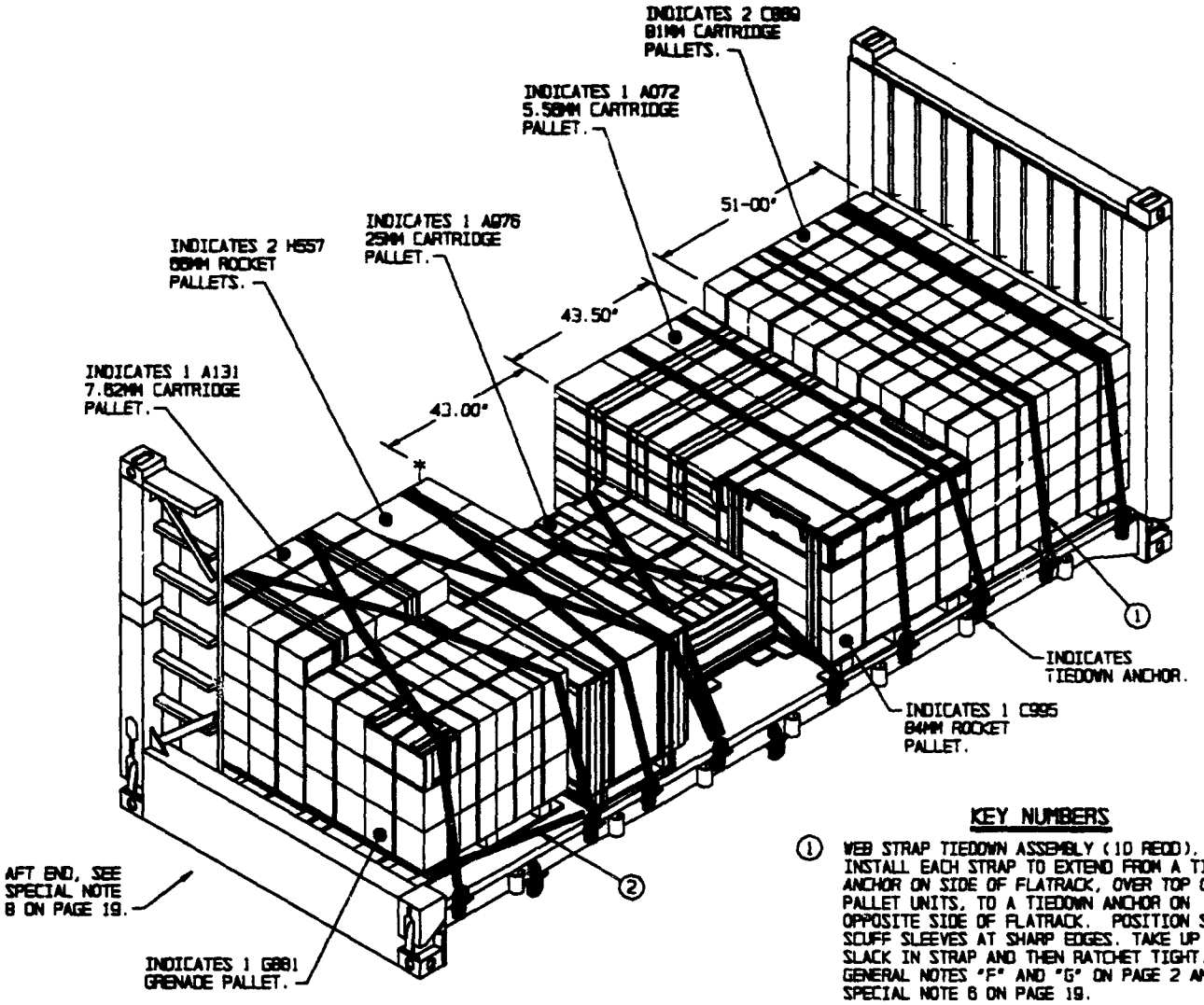
7. EACH PALLET UNIT MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW.

8. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

9. A TOTAL OF ELEVEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
7.62MM PALLET	10	31,810 LBS



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (10 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 8 ON PAGE 19.

② WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR ROW AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

TYPICAL AMMUNITION ITEMS				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
C869	81MM CARTRIDGE 51.00 L X 42.00 W X 44.87 H	180	2 PALLETS	3,596 LBS
A072	5.56MM CARTRIDGE 51.00 L X 43.50 W X 39.00 H	30,640	1 PALLET	3,401 LBS
C995	84MM, AT4 ROCKET 45.87 L X 35.50 W X 38.00 H	20	1 PALLET	529 LBS
A976	25MM CTG, M621 CNTR 53.00 L X 43.00 W X 21.37 H	810	1 PALLET	1,515 LBS
H557	66MM ROCKET, LAW 41.25 L X 33.50 W X 36.87 H	90	2 PALLETS	796 LBS
A131	7.62MM CARTRIDGE 46.00 L X 35.00 W X 46.12 H	32,000	1 PALLET	3,181 LBS
G881	HAND GRENADES 45.75 L X 37.87 W X 39.25 H	720	1 PALLET	1,309 LBS

SPECIAL NOTES:

1. A TYPICAL LOAD OF MIXED BOXED AMMUNITION IS SHOWN LOADED ON THE M1 FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 18'-6" LONG AND A MAXIMUM LOAD WEIGHT OF 28,750 POUNDS.

2. THE LOAD SHOWN ON PAGE 18 MAY ALSO BE LOADED ON AN A-FRAME FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE LOAD SHOWN IS TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES. NOTE: THE PALLET LENGTH PLUS THE PALLET WIDTH CAN NOT EXCEED 7'-6-1/2".

4. PRIOR TO LOADING THE PALLETS, ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE FORWARD END WALL AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

6. EACH LATERAL ROW OF TWO PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW.

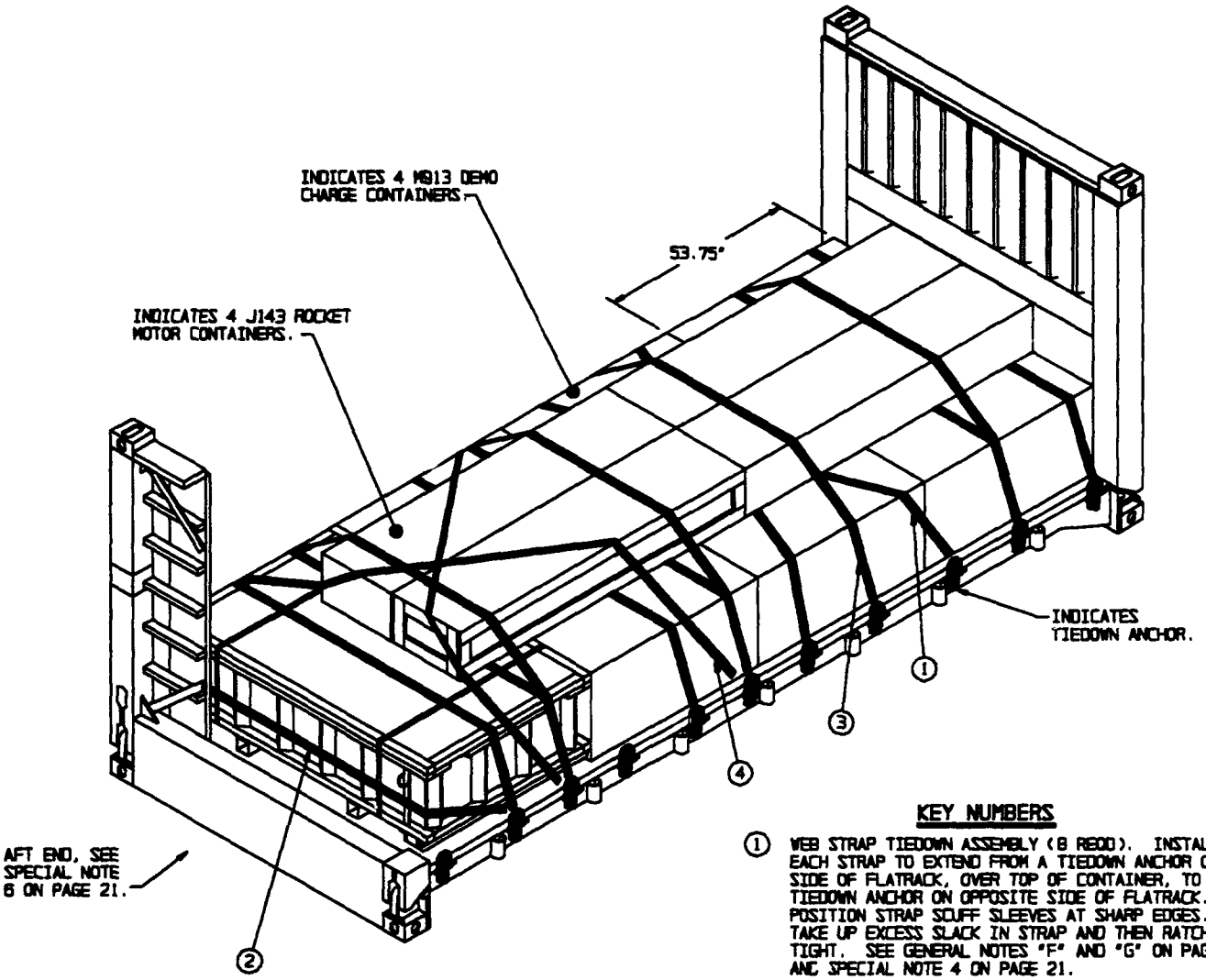
7. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

8. ONLY A PARTIAL AFT END WALL IS SHOWN ON THE ISOMETRIC VIEW TO PREVENT DISTRACTION OF THE LOADING AND TIEDOWN PROCEDURES AND TO IMPROVE THE CLARITY OF THE DEPICTED PROCEDURES.

9. A TOTAL OF ELEVEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
MIXED PALLETS	9	14,327 LBS



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (8 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF CONTAINER, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 4 ON PAGE 21.

② WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND REAR CONTAINER, AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF ROCKET MOTOR BOX, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

④ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, DIAGONALLY OVER AFT END OF BOX, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

M58A3 LINEAR DEMOLITION CHARGE (MICLIC) CCL				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
M913	DEMO CHARGE M58A3 83.25 L X 53.75 W X 24.75 H	4	4 CNTRS	11,600 LBS
J143	5-INCH ROCKET MOTOR 92.50 L X 22.50 W X 13.50 H	4	4 BOXES	800 LBS

M58A3 LINEAR DEMOLITION CHARGE (MICLIC) COMBAT CONFIGURED LOAD FOR ENGINEERS

SPECIAL NOTES:

1. A TYPICAL MICLIC DEMOLITION CHARGE COMBAT CONFIGURED LOAD FOR ENGINEERS IS SHOWN LOADED ON THE M1 FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-8-1/2" WIDE BY 18'-8" LONG AND A MAXIMUM LOAD WEIGHT OF 28,750 POUNDS.

2. THE LOAD SHOWN ON PAGE 20 MAY ALSO BE LOADED ON AN A-FRAME FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE FORWARD END WALL AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

4. EACH CONTAINER MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP.

5. ALL CONTAINERS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN CONTAINERS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

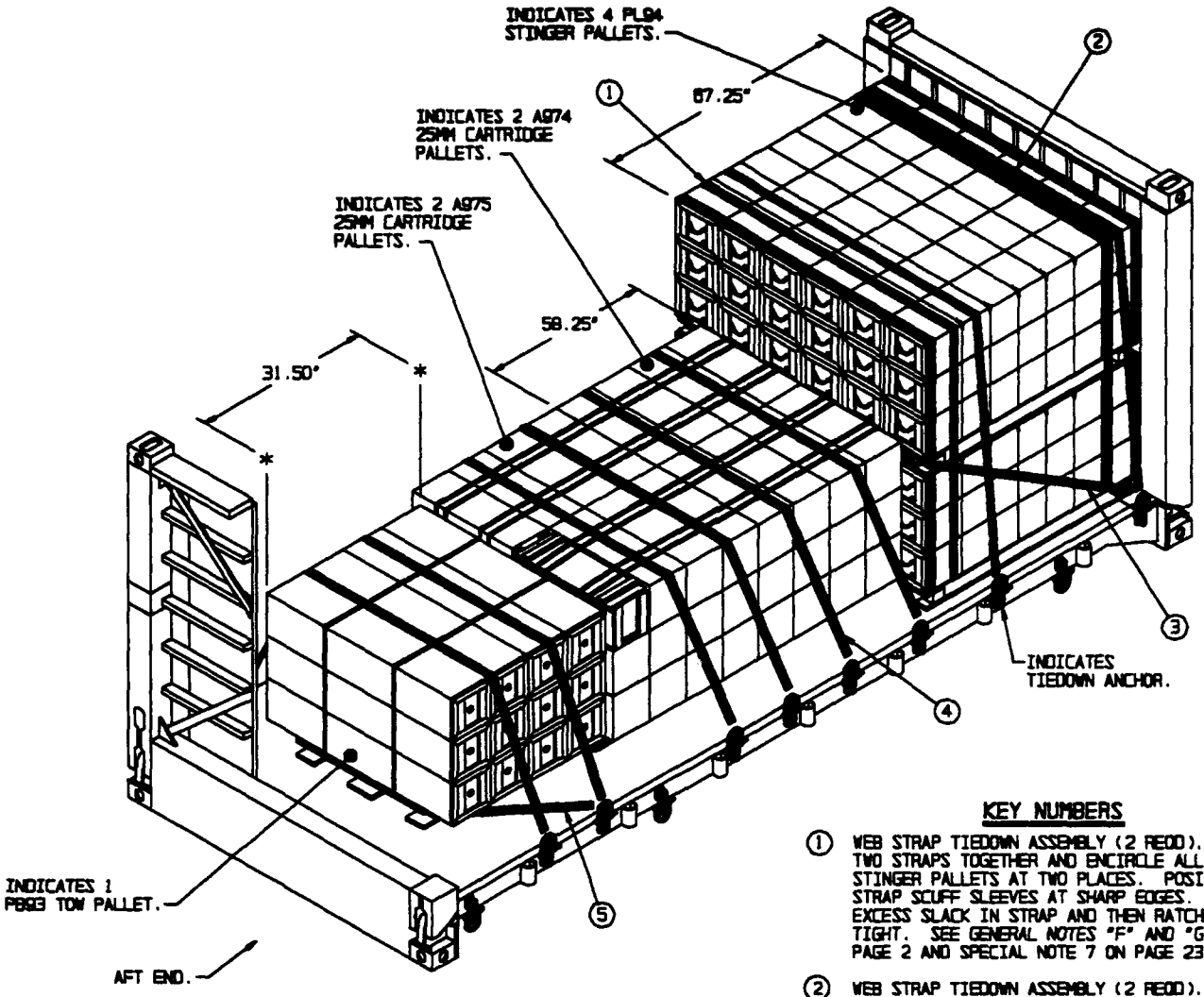
6. ONLY A PARTIAL AFT END WALL IS SHOWN ON THE ISOMETRIC VIEW TO PREVENT DISTRACTION OF THE LOADING AND TIEDOWN PROCEDURES AND TO IMPROVE THE CLARITY OF THE DEPICTED PROCEDURES.

7. A TOTAL OF FIFTEEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
DEMO CHARGE	4	11,600 LBS
ROCKET MOTOR	4	800 LBS
	TOTAL WEIGHT	12,400 LBS

M58A3 LINEAR DEMOLITION CHARGE (MICLIC) COMBAT CONFIGURED LOAD FOR ENGINEERS



ISOMETRIC VIEW

TYPICAL AMMUNITION ITEMS				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
PL94	STINGER, MR-RMP 39.37 L X 67.25 W X 36.50 H	36	4 PALLETS	2,996 LBS
P893	TOW, IIA (HE) 48.00 L X 58.25 W X 39.75 H	12	1 PALLET	1,127 LBS
A974	25MM CARTRIDGE, APDS-T, M791 31.50 L X 45.00 W X 42.50 H	1,200	2 PALLETS	2,482 LBS
A975	25MM CARTRIDGE, HEI-T, M792 31.50 L X 45.00 W X 39.75 H	1,200	2 PALLETS	2,482 LBS

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (2 REQD). HOOK TWO STRAPS TOGETHER AND ENCIRCLE ALL FOUR STINGER PALLETS AT TWO PLACES. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 23.

② WEB STRAP TIEDOWN ASSEMBLY (2 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF TWO HIGH PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 8 ON PAGE 23.

③ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES IN SECOND LAYER, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

④ WEB STRAP TIEDOWN ASSEMBLY (6 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK OVER TOP OF ONE HIGH PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 8 ON PAGE 23.

⑤ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASE OF REAR PALLET, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

SPECIAL NOTES:

1. A TYPICAL COMBAT CONFIGURED LOAD FOR AIR DEFENSE ARTILLERY IS SHOWN LOADED ON THE M1 FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 18'-8" LONG AND A MAXIMUM LOAD WEIGHT OF 28,750 POUNDS.

2. THE LOAD AS SHOWN ON PAGE 22 MAY ALSO BE LOADED ON THE A-FRAME FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE PALLET/SKIDDED UNITS SHOWN ARE TYPICAL ONLY. IF LOADING UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE PALLET/SKIDDED UNITS, ASSURE THAT ALL STEEL STRAPPING IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE FORWARD END WALL AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. ASSURE THAT THE TOP LAYER PALLET/SKIDDED UNITS ARE IN VERTICAL ALIGNMENT WITH THE BOTTOM LAYER PALLET/SKIDDED UNITS.

6. ALL PALLET/SKIDDED UNITS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET/SKIDDED UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

7. EACH LATERAL ROW OF TWO HIGH PALLET/SKIDDED UNITS MUST BE UNITIZED AT TWO LOCATIONS WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ① AND SECURED TO THE FLATRACK AT TWO LOCATIONS WITH WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ②.

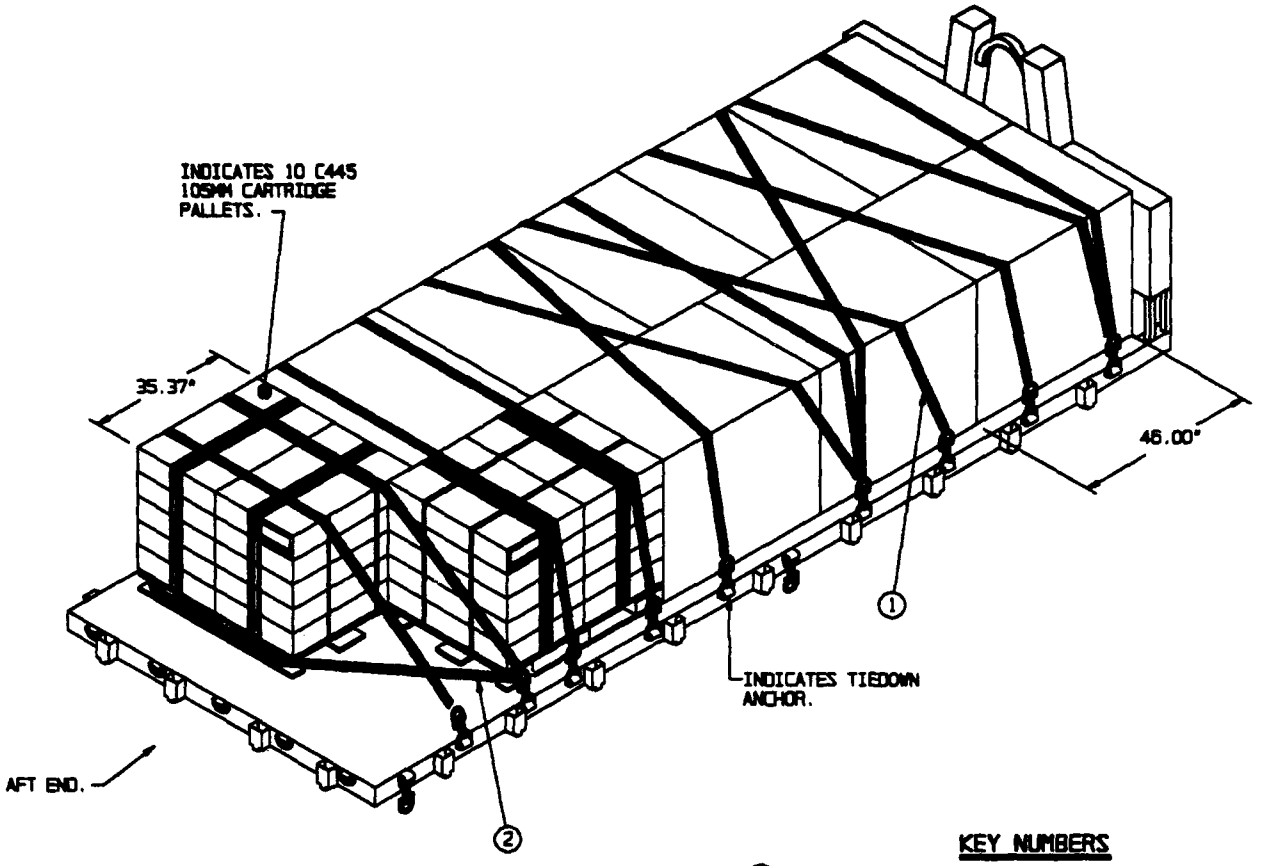
8. EACH LATERAL ROW OF ONE, TWO, OR FOUR PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW.

9. ONLY A PARTIAL AFT END WALL IS SHOWN ON THE ISOMETRIC VIEW TO PREVENT DISTRACTION OF THE LOADING AND TIEDOWN PROCEDURES AND TO IMPROVE THE CLARITY OF THE DEPICTED PROCEDURES.

10. A TOTAL OF SEVENTEEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CCL	1	9,087 LBS



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (12 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK OVER TOP OF PALLET UNITS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 25.

② WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASE OF REAR ROW AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

TYPICAL AMMUNITION ITEM				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
C445	105MM CARTRIDGE 48.00 L X 35.37 W X 36.75 H	400	10 PALLETS	21,111 LBS

SPECIAL NOTES:

1. A TYPICAL LOAD OF 10 PALLETS OF 105MM CARTRIDGES IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 39,000 POUNDS.

2. THE LOAD AS SHOWN ON PAGE 24 MAY ALSO BE LOADED ON AN M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. BY POSITIONING THE PALLETS AS SHOWN IN THE LOAD ON PAGE 24 THE LOAD LENGTH CAN BE REDUCED AND/OR THE LOAD QUANTITY CAN BE INCREASED. FOR EXAMPLE, IF THE PALLETS SHOWN IN THE LOAD ON PAGE 24 WERE POSITIONED TWO WIDE AND FOUR LONG WITH THE 46.00" DIMENSION PARALLEL TO THE SIDES OF THE FLATRACK THERE WOULD BE ENOUGH ROOM AT THE AFT END TO POSITION ONE MORE PALLET WITH THE 35.37" DIMENSION PARALLEL TO THE SIDES OF THE FLATRACK FOR A MAXIMUM LOAD OF NINE PALLETS. HOWEVER, BY POSITIONING SIX PALLETS ON ONE SIDE OF THE FLATRACK WITH THE 35.37" DIMENSION PARALLEL TO THE SIDES OF THE FLATRACK, AND FOUR PALLETS ON THE OPPOSITE SIDE OF THE FLATRACK WITH THE 46.00" DIMENSION PARALLEL TO THE SIDES OF THE FLATRACK, THE LOAD QUANTITY CAN BE INCREASED FOR A MAXIMUM LOAD OF TEN PALLETS. NOTE: WHEN LOADING PALLETS AS SHOWN ON PAGE 24 THE PALLET LENGTH PLUS THE PALLET WIDTH MUST NOT EXCEED THE CARGO DECK WIDTH OF THE FLATRACK (REF: 7'-6-1/2"). FOR AN ALTERNATIVE METHOD SEE THE CHIMNEY PATTERN LOAD ON PAGES 16 AND 17.

4. THE PALLET SHOWN IS TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

5. PRIOR TO LOADING THE 105MM PALLETS, ASSURE THAT ALL STEEL STRAPPING IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

6. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK.

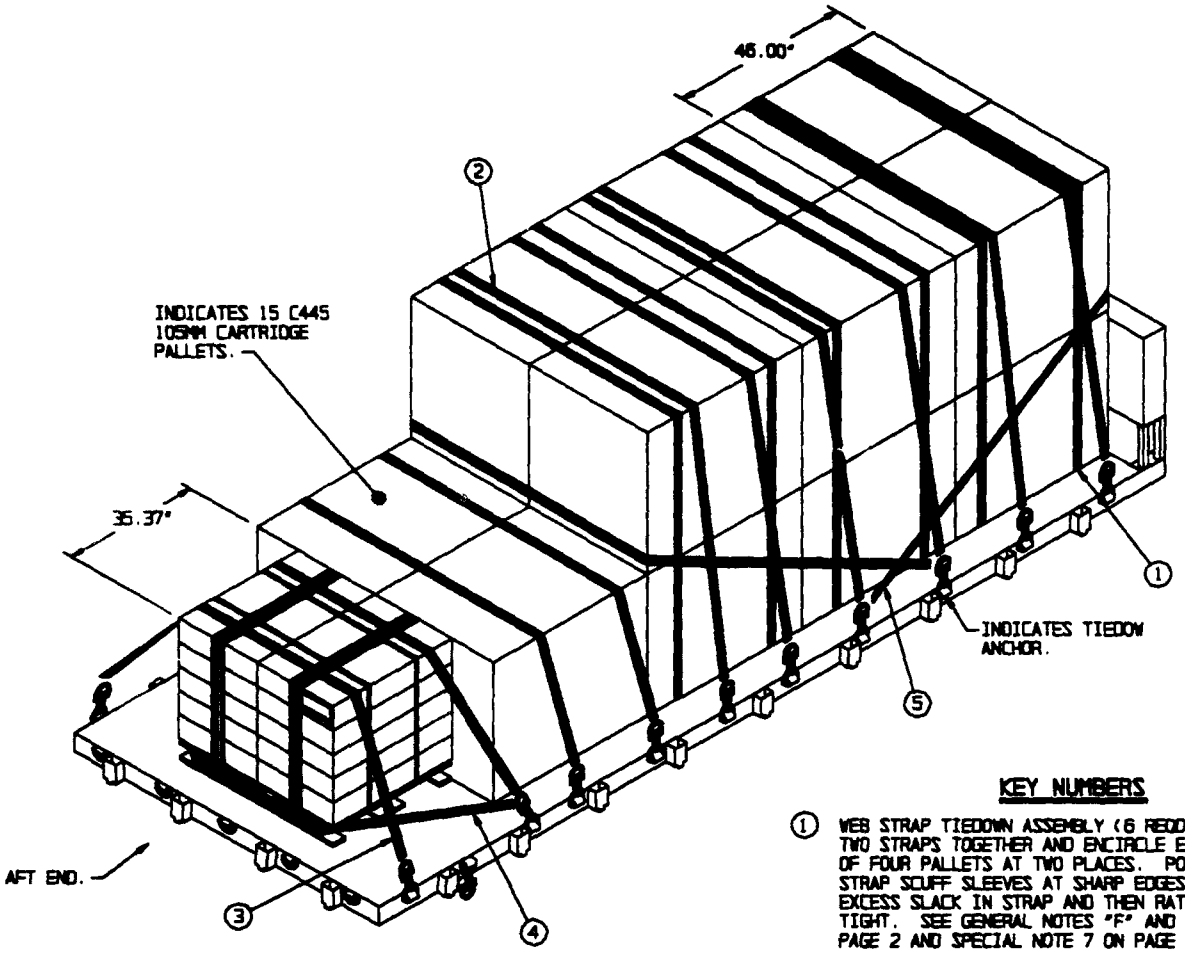
7. EACH PALLET MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW. BECAUSE THE PALLETS ARE OFFSET LATERALLY, SOME PALLETS WILL HAVE THREE STRAPS OVER THE TOP.

8. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET/SKIDDED UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

9. A TOTAL OF THIRTEEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
105MM PALLET	10	21,111 LBS



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (6 REQD). HOOK TWO STRAPS TOGETHER AND ENCIRCLE EACH STACK OF FOUR PALLETS AT TWO PLACES. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 27.

② WEB STRAP TIEDOWN ASSEMBLY (6 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF LOAD, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 27.

③ WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF ONE HIGH PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 8 ON PAGE 27.

④ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASE OF REAR PALLET, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑤ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES AT FORWARD AND REAR END OF SECOND LAYER, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

TYPICAL AMMUNITION ITEM				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
C445	105MM CARTRIDGE 46.00 L X 35.37 W X 44.87 H	600	15 PALLETS	31,665 LBS

105MM CARTRIDGES IN WOODEN BOXES (TWO HIGH)

SPECIAL NOTES:

1. A TYPICAL PARTIAL TWO HIGH LOAD OF 15 PALLETS OF 105MM CARTRIDGES IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7-8-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 39,000 POUNDS.

2. IF LOADING AN M1 FLATRACK HAVING A MAXIMUM LOAD WEIGHT OF 28,750 POUNDS, OMIT THE REARMOST TWO PALLETS FROM THE TOP LAYER. THIS WILL REDUCE THE QUANTITY FROM 15 PALLETS TO 13 PALLETS AND THE LOAD WEIGHT FROM 31,665 POUNDS TO 27,443 POUNDS. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE PALLET SHOWN IS TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE PALLETS, ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. ASSURE THAT THE TOP LAYER PALLETS ARE IN VERTICAL ALIGNMENT WITH THE BOTTOM LAYER PALLETS.

6. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPS TO BECOME LOOSE.

7. EACH LATERAL ROW OF FOUR PALLETS MUST BE UNITIZED AT TWO LOCATIONS WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ① AND SECURED TO THE VEHICLE AT TWO LOCATIONS WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ②. STRAPS MARKED ② MAY BE CROSSED AND/OR POSITIONED STRAIGHT OVER THE TOP OF A ROW.

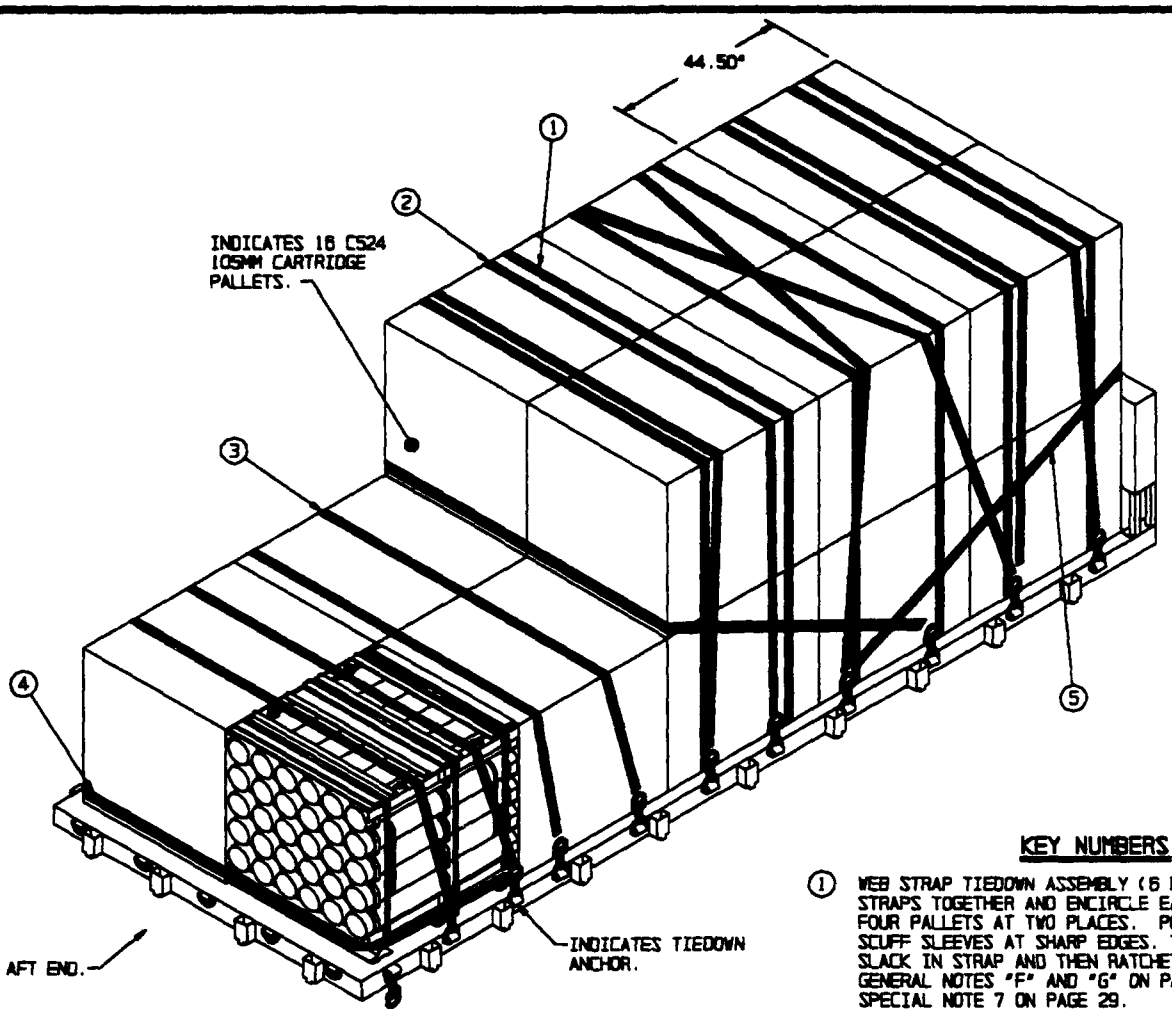
8. EACH LATERAL ROW OF ONE OR TWO PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW.

9. A TOTAL OF THIRTY-THREE WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
105MM PALLET	15	31,665 LBS

105MM CARTRIDGES IN WOODEN BOXES (TWO HIGH)



ISOMETRIC VIEW

KEY NUMBERS

(1) WEB STRAP TIEDOWN ASSEMBLY (6 REQD). HOOK TWO STRAPS TOGETHER AND ENCIRCLE EACH STACK OF FOUR PALLETS AT TWO PLACES. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 29.

(2) WEB STRAP TIEDOWN ASSEMBLY (6 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF LOAD, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 29.

(3) WEB STRAP TIEDOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF ONE HIGH PALLETS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 8 ON PAGE 29.

(4) WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR PALLETS IN BOTTOM LAYER, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

(5) WEB STRAP TIEDOWN ASSEMBLY (2 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES AT FORWARD AND REAR END OF SECOND LAYER, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

TYPICAL AMMUNITION ITEM				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
C524	105MM CARTRIDGE IN PA117 CNTR 44.50 L X 42.00 W X 39.50 H	480	16 PALLETS	30,128 LBS

105MM CARTRIDGE IN PA117 CONTAINER (TWO HIGH)

SPECIAL NOTES:

1. A TYPICAL PARTIAL TWO HIGH LOAD OF 16 PALLETS OF 105MM CARTRIDGE IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7-8-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. IF LOADING AN M1 FLATRACK HAVING A MAXIMUM LOAD WEIGHT OF 28,750 POUNDS, OMIT ONE OF THE REARMOST TWO PALLETS AND TURN THE REMAINING PALLET 90° SO THE "42.00" DIMENSION IS PARALLEL TO THE SIDES OF THE FLATRACK IN LIEU OF THE 44.50" DIMENSION. THIS WILL REDUCE THE QUANTITY FROM 16 PALLETS TO 15 PALLETS AND THE LOAD WEIGHT FROM 30,128 POUNDS TO 28,245 POUNDS. ALSO, IT WILL REDUCE THE LOAD LENGTH FROM 18'-8-1/2" TO 18'-4". SEE GENERAL NOTE "C" ON PAGE 2.

3. THE PALLET SHOWN IS TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE PALLETS, ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. ASSURE THAT THE TOP LAYER PALLETS ARE IN VERTICAL ALIGNMENT WITH THE BOTTOM LAYER PALLETS.

6. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPS TO BECOME LOOSE.

7. EACH LATERAL ROW OF FOUR PALLETS MUST BE UNITIZED AT TWO LOCATIONS WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ① AND SECURED TO THE VEHICLE AT TWO LOCATIONS WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ②. STRAPS MARKED ② MAY BE CROSSED AND/OR POSITIONED STRAIGHT OVER THE TOP OF A ROW.

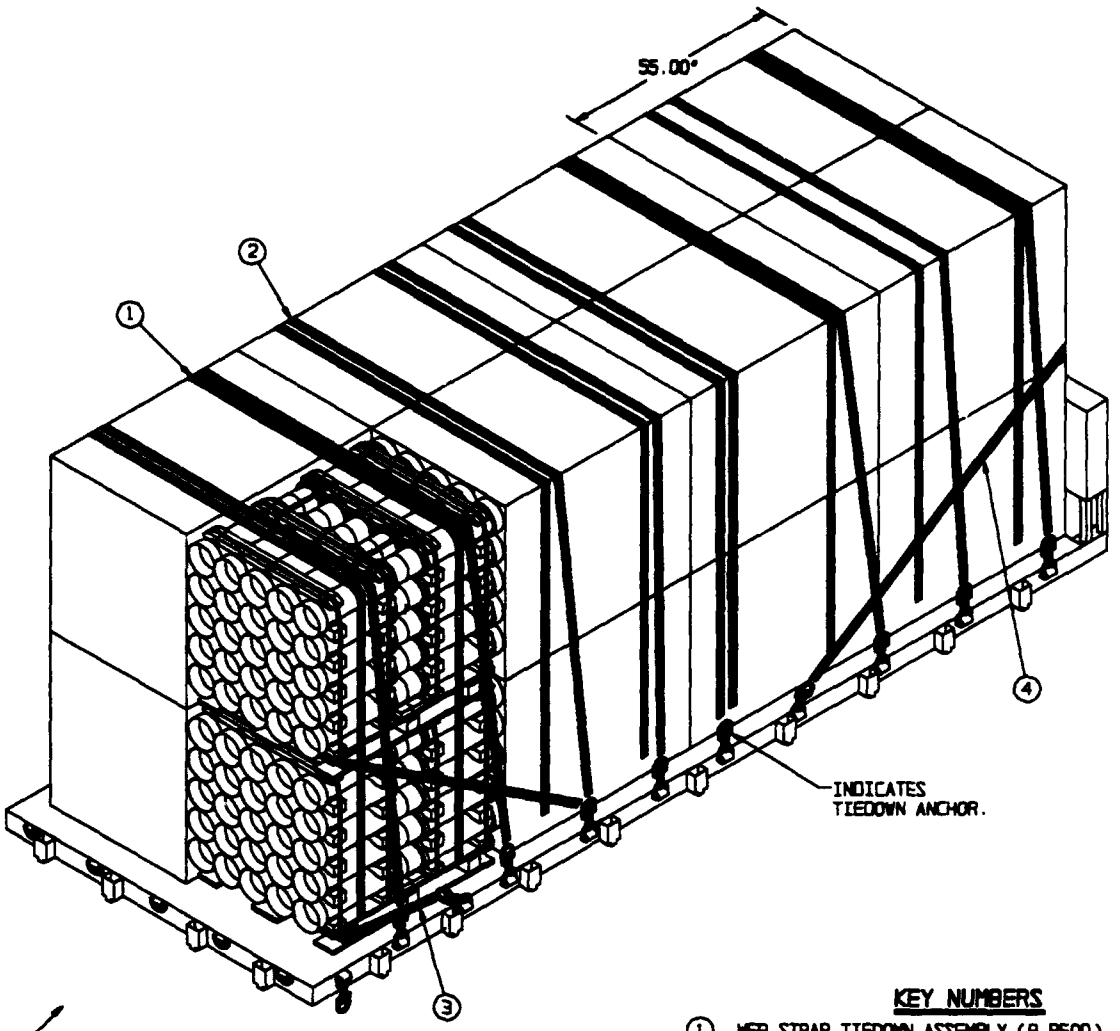
8. EACH LATERAL ROW OF TWO PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW.

9. A TOTAL OF THIRTY-THREE WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
105MM PALLET	16	30,128 LBS

105MM CARTRIDGE IN PA117 CONTAINER (TWO HIGH)



ISOMETRIC VIEW

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (8 REQD). HOOK TWO STRAPS TOGETHER AND ENCIRCLE EACH STACK OF FOUR PALLETS AT TWO PLACES. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 31.

② WEB STRAP TIEDOWN ASSEMBLY (8 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF LOAD, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2 AND SPECIAL NOTE 7 ON PAGE 31.

③ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES OF REAR PALLETS IN BOTTOM LAYER, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

④ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). HOOK TWO STRAPS TOGETHER AND INSTALL TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND PALLET BASES IN SECOND LAYER AT FORWARD AND REAR END OF LOAD, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

TYPICAL AMMUNITION ITEM				
DODIC	ITEM	ITEM QUANTITY	LOAD QUANTITY	TOTAL WEIGHT
D541	155MM PROP CHARGE 40.00 L X 55.00 W X 44.87 H	800	16 PALLETS	28,256

155MM PROPELLING CHARGE CONTAINERS (TWO HIGH)

SPECIAL NOTES:

1. A TYPICAL TWO HIGH LOAD OF 16 PALLETS OF 155MM PROPELLING CHARGE CONTAINERS IS SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7-8-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. THE LOAD AS SHOWN ON PAGE 30 MAY ALSO BE LOADED ON AN M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE PALLET SHOWN IS TYPICAL ONLY. IF LOADING PALLETIZED UNITS OF OTHER ITEMS, SIZES, OR QUANTITIES, FOLLOW THESE SAME PROCEDURES.

4. PRIOR TO LOADING THE 155MM PALLETS, ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

5. WHEN LOADING THE FLATRACK, POSITION THE LOAD TIGHT AGAINST THE A-FRAME AND CENTERED ACROSS THE WIDTH OF THE FLATRACK. ASSURE THAT THE TOP LAYER PALLETS ARE IN VERTICAL ALIGNMENT WITH THE BOTTOM LAYER PALLETS.

6. ALL PALLETS MUST BE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPS TO BECOME LOOSE.

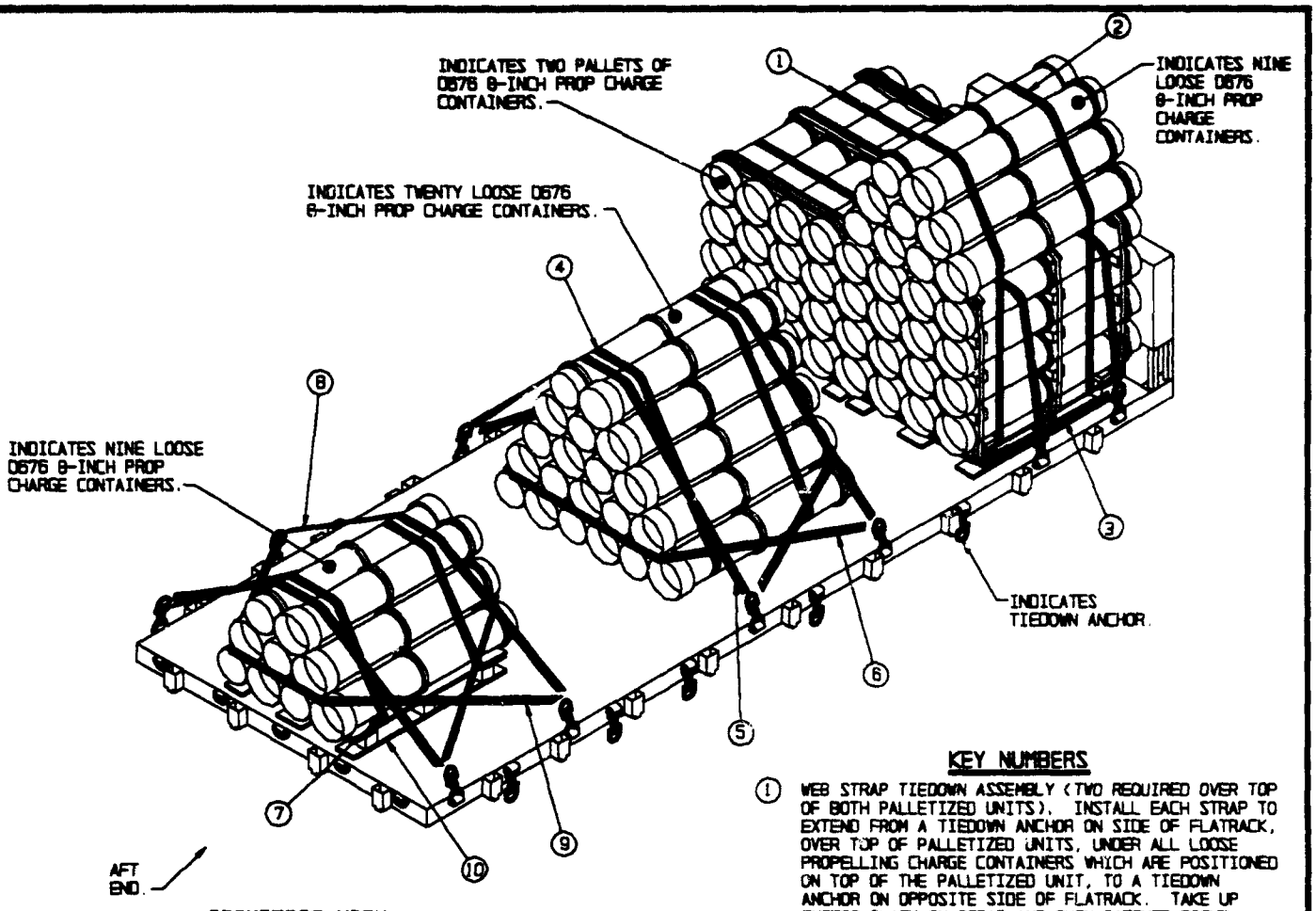
7. EACH LATERAL ROW OF FOUR PALLETS MUST BE UNITIZED AT TWO LOCATIONS WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ① AND SECURED TO THE VEHICLE AT TWO LOCATIONS WITH WEB STRAP TIEDOWN ASSEMBLIES MARKED ②. STRAPS MARKED ② MAY BE CROSSED AND/OR POSITIONED STRAIGHT OVER THE TOP OF A ROW.

8. A TOTAL OF THIRTY-SEVEN WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD AS SHOWN.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
155MM PC PALLET	16	28,256 LBS

155MM PROPELLING CHARGE CONTAINERS (TWO HIGH)



ISOMETRIC VIEW

KEY NUMBERS

(1) WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED OVER TOP OF BOTH PALLETIZED UNITS). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLETIZED UNITS, UNDER ALL LOOSE PROPELLING CHARGE CONTAINERS WHICH ARE POSITIONED ON TOP OF THE PALLETIZED UNIT, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. NOTE: STRAPS MARKED (1) CAN BE INSTALLED OVER TOP OF THE PALLETIZED UNITS PRIOR TO POSITIONING THE LOOSE PROPELLING CHARGE CONTAINERS ON TOP OF THE PALLETIZED UNIT, OR STRAPS MARKED (1) CAN BE INSTALLED OVER TOP OF THE PALLETIZED UNIT AFTER THE LOOSE PROPELLING CHARGE CONTAINERS HAVE BEEN POSITIONED, AND SECURED, ON TOP OF THE PALLETIZED UNIT. A PIECE OF WIRE, OR STICK, CAN BE USED TO PULL THE NON-RATCHET END OF THE STRAP THROUGH THE OPENING BETWEEN THE TOP OF THE PALLETIZED UNIT AND THE BOTTOM OF THE LOOSE PROPELLING CHARGE CONTAINERS.

(2) WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF LOOSE PROPELLING CHARGE CONTAINERS ON TOP OF A PALLETIZED UNIT). INSTALL EACH STRAP TO ENCIRCLE PALLETIZED UNIT AND ALL LOOSE PROPELLING CHARGE CONTAINERS POSITIONED ON TOP OF THE PALLETIZED UNIT. PRIOR TO POSITIONING LOOSE CONTAINERS ON THE PALLETIZED UNIT, THREAD STRAPS MARKED (2) UNDER THE TOP DECK OF THE PALLET WITH BOTH RATCHET ENDS ON THE SAME SIDE OF THE PALLET. MAKE SURE THAT STRAPS LAY FLAT WITH NO TWISTS IN THEM. POSITION THE FIRST LAYER OF PROPELLING CHARGE CONTAINERS ON THE TOP OF THE PALLETIZED UNIT, WITH ENDS ALTERNATED. ADJUST THE TWO STRAPS MARKED (2) SO THEY WILL BE CLOSE TO THE BELL END AND THE ROLLING FLANGE ON THE OPPOSITE END OF THE LOOSE CONTAINERS. KEEP THE BOTTOM LAYER CONTAINERS TIGHT AGAINST EACH OTHER AND STACK THE REMAINING CONTAINERS, IN LAYERS, WITH THE ENDS ALTERNATED, ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, BRING ENDS OF STRAPS UP OVER TOP OF LOOSE CONTAINERS AND HOOK ENDS OF STRAP TOGETHER. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. NOTE: AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS SO THEY FORM A TIGHT BUNDLE ON TOP OF THE PALLETIZED UNIT. SINCE THE CONTAINERS MAY SEEK THEIR NATURAL POSITION DURING TRANSPORT, CHECK STRAPS FOR TIGHTNESS AND RE-TIGHTEN IF NECESSARY. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

(KEY NUMBERS CONTINUED AT LEFT)

(KEY NUMBERS CONTINUED)

(3) WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PALLETS AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

(4) WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF LOOSE PROPELLING CHARGE CONTAINERS) INSTALL EACH STRAP TO ENCIRCLE ALL PROPELLING CHARGE CONTAINERS IN THE BUNDLE. PRE-POSITION THESE TWO STRAPS ON THE FLOOR OF THE FLATRACK PRIOR TO LOADING PROPELLING CHARGE CONTAINERS. MAKE SURE STRAPS LAY FLAT ACROSS THE FLOOR AND DRAPE THE ENDS OVER THE SIDE OF THE FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. POSITION THE FIRST LAYER OF PROPELLING CHARGE CONTAINERS ON THE FLOOR, WITH ENDS ALTERNATED. ADJUST THE TWO STRAPS SO THEY WILL BE CLOSE TO THE BELL END AND THE ROLLING FLANGE ON THE OPPOSITE END OF THE LOOSE CONTAINERS. KEEP THE BOTTOM LAYER CONTAINERS TIGHT AGAINST EACH OTHER BY USING WEDGES AT SIDES OR HOLD IN PLACE MANUALLY AND STACK THE REMAINING CONTAINERS, IN LAYERS, WITH THE ENDS ALTERNATED, ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, HOOK ENDS OF WEB STRAP TIEDOWN ASSEMBLIES TOGETHER, TAKE UP SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. NOTE: AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

(KEY NUMBERS CONTINUED ON PAGE 33)

SPECIAL NOTES:

1. TYPICAL METHODS OF SECURING LOOSE PROPELLING CHARGE CONTAINERS ON TOP OF A PALLETIZED UNIT, ON THE FLOOR OF THE FLATRACK, AND ON A PALLET, ARE SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. THE PROCEDURES FOR SECURING LOOSE PROPELLING CHARGE CONTAINERS SHOWN ON PAGE 32 MAY ALSO BE USED ON THE M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE PROPELLING CHARGE CONTAINER SHOWN IS TYPICAL ONLY AND THESE METHODS MAY BE USED FOR PROPELLING CHARGE CONTAINERS OF DIFFERENT SIZES AND WEIGHTS.

4. ONE METHOD SHOWN ON PAGE 32 DEPICTS SECUREMENT OF NINE LOOSE D676 8-INCH M10 SERIES PROPELLING CHARGE CONTAINERS ON TOP OF A FULL PALLET OF SIXTEEN CONTAINERS WHICH IS SECURED TO THE FLATRACK. HOLD-DOWN STRAPS MARKED ① ARE POSITIONED OVER TOP OF THE PALLETIZED UNIT AND MUST NOT BE POSITIONED OVER TOP OF THE LOOSE PROPELLING CHARGE CONTAINERS ON TOP OF A PALLETIZED UNIT. SEE KEY NUMBERS ① AND ② ON PAGE 32 FOR GUIDANCE WHEN LOADING LOOSE PROPELLING CHARGE CONTAINERS ON TOP OF PALLETIZED UNITS.

5. WHEN LOADING LOOSE PROPELLING CHARGE CONTAINERS ON TOP OF A PALLETIZED UNIT ASSURE THAT ALL LOOSE CONTAINERS ARE SECURED BY MANUALLY GUIDING CONTAINERS INTO A TIGHT CONFIGURATION AS THE TWO HOLD-DOWN STRAPS MARKED ② ARE BEING TIGHTENED. AFTER STRAPS HAVE BEEN RATCHETED TIGHT, CHECK BUNDLE TO MAKE SURE ALL LOOSE CONTAINERS ARE SECURED. NOTE: WHEN USING THIS METHOD, POSITION ONE THROUGH ONE FULL LAYER OF LOOSE CONTAINERS IN THE FIRST LAYER. A SECOND LAYER MUST CONSIST OF A MAXIMUM QUANTITY OF CONTAINERS THAT CAN BE POSITIONED ON THE FIRST LAYER, BY NESTING THE SECOND LAYER CONTAINERS ON THE FIRST LAYER OF CONTAINERS. IF THERE ARE NOT ENOUGH CONTAINERS FOR A FULL SECOND LAYER, THEY MUST BE POSITIONED ON TOP OF A DIFFERENT PALLET OR PALLETIZED UNIT. FOR EXAMPLE, IF A FULL FIRST LAYER CONSISTS OF FIVE LOOSE CONTAINERS THE SECOND FULL LAYER WOULD HAVE TO CONSIST OF FOUR CONTAINERS.

6. ALL LOOSE CONTAINERS POSITIONED ON TOP OF A PALLETIZED UNIT MUST FORM A TIGHT BUNDLE AFTER STRAPS MARKED ② ARE RATCHETED TIGHT. IF CONTAINERS DO NOT FORM A TIGHT BUNDLE, TWO ADDITIONAL WEB STRAP ASSEMBLIES WHICH ENCIRCLE ALL LOOSE CONTAINERS WITHIN THE BUNDLE ARE REQUIRED.

7. A SECOND METHOD SHOWN ON PAGE 32 DEPICTS SECUREMENT OF TWENTY LOOSE D676 8-INCH M10 SERIES PROPELLING CHARGE CONTAINERS IN ONE BUNDLE POSITIONED ON THE FLOOR OF THE FLATRACK. THE QUANTITY OF CONTAINERS WITHIN A BUNDLE MAY BE A MINIMUM OF FIVE, UP TO A QUANTITY THAT CAN BE ENCIRCLED WITH ONE WEB STRAP TIEDOWN ASSEMBLY MARKED ④. IF LOADING CONTAINERS OF OTHER DIMENSIONS AND QUANTITIES, FOLLOW THESE SAME PROCEDURES.

8. LOOSE PROPELLING CHARGE CONTAINERS OF DIFFERENT LENGTHS AND DIAMETERS MAY BE MIXED WITHIN THE SAME BUNDLE, AS LONG AS THEY ARE POSITIONED IN SUCH A MANNER THAT ALL THE CONTAINERS WITHIN THE COMPLETED BUNDLE ARE HELD TIGHT. GENERALLY, IT IS BEST TO POSITION THE LARGER CONTAINERS ON THE BOTTOM AND THE SMALLER CONTAINERS ON THE TOP. SHORT CONTAINERS SHOULD BE CENTERED ON LONG CONTAINERS AND, WHEN POSSIBLE, POSITIONED IN SUCH A MANNER THAT THE ROLLING FLANGES AND BELL ENDS WILL "LOCK" IN ON OTHER CONTAINERS AND HELP SECURE THE BUNDLE. NOTE: AFTER A BUNDLE OF MIXED PROPELLING CHARGE CONTAINERS HAS BEEN SECURED IT MAY BE POSSIBLE TO MANUALLY "WIGGLE" A CONTAINER WITHIN THE BUNDLE. THIS IS ACCEPTABLE AS LONG AS THE CONTAINER CANNOT BE MANUALLY PULLED OUT OF THE BUNDLE AND IT STAYS IN PLACE DURING TRANSPORT.

9. A THIRD METHOD SHOWN ON PAGE 32 DEPICTS SECUREMENT OF NINE LOOSE D676 8-INCH M10 SERIES PROPELLING CHARGE CONTAINERS POSITIONED ON A 40" X 48" PALLET. THE QUANTITY OF CONTAINERS ON ONE PALLET MAY BE ONE UP TO A QUANTITY THAT CAN BE ENCIRCLED WITH ONE WEB STRAP TIEDOWN ASSEMBLY MARKED ⑦.

10. ALL LOOSE CONTAINERS POSITIONED ON TOP OF A PALLET MUST FORM A TIGHT BUNDLE AFTER STRAPS MARKED ⑦ ARE RATCHETED TIGHT. IF CONTAINERS DO NOT FORM A TIGHT BUNDLE, OR IF CONTAINERS OF DIFFERENT SIZES ARE BEING POSITIONED ON TOP OF THE SAME PALLET, TWO ADDITIONAL WEB STRAP TIEDOWN ASSEMBLIES MARKED ⑦ IN THE LOAD ON PAGE 32, ARE REQUIRED. SEE KEY NUMBERS ⑦, ⑧, AND ⑨ ON THIS PAGE FOR ADDITIONAL GUIDANCE.

(KEY NUMBERS CONTINUED FROM PAGE 32)

⑤ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF LOOSE PROPELLING CHARGE CONTAINERS). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK OVER TOP OF PROPELLING CHARGE CONTAINERS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH RATCHETS ON THE SAME SIDE OF THE FLATRACK. ATTACH WEB STRAP TIEDOWN ASSEMBLY MARKED ⑥ TO THE TIEDOWN ANCHOR PRIOR TO RATCHETING WEB STRAP TIEDOWN ASSEMBLIES MARKED ⑤ TIGHT. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS MARKED ⑤ AT THE SAME TIME. NOTE: THESE STRAPS SHOULD ALWAYS BE POSITIONED BETWEEN THE BELL ON ONE END OF A CONTAINER AND THE ROLLING FLANGE ON THE OPPOSITE END OF THE SAME CONTAINER. DUE TO LOCATION OF TIEDOWN ANCHORS, IT MAY BE NECESSARY TO ANGLE THESE STRAPS SLIGHTLY TO MEET THIS REQUIREMENT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

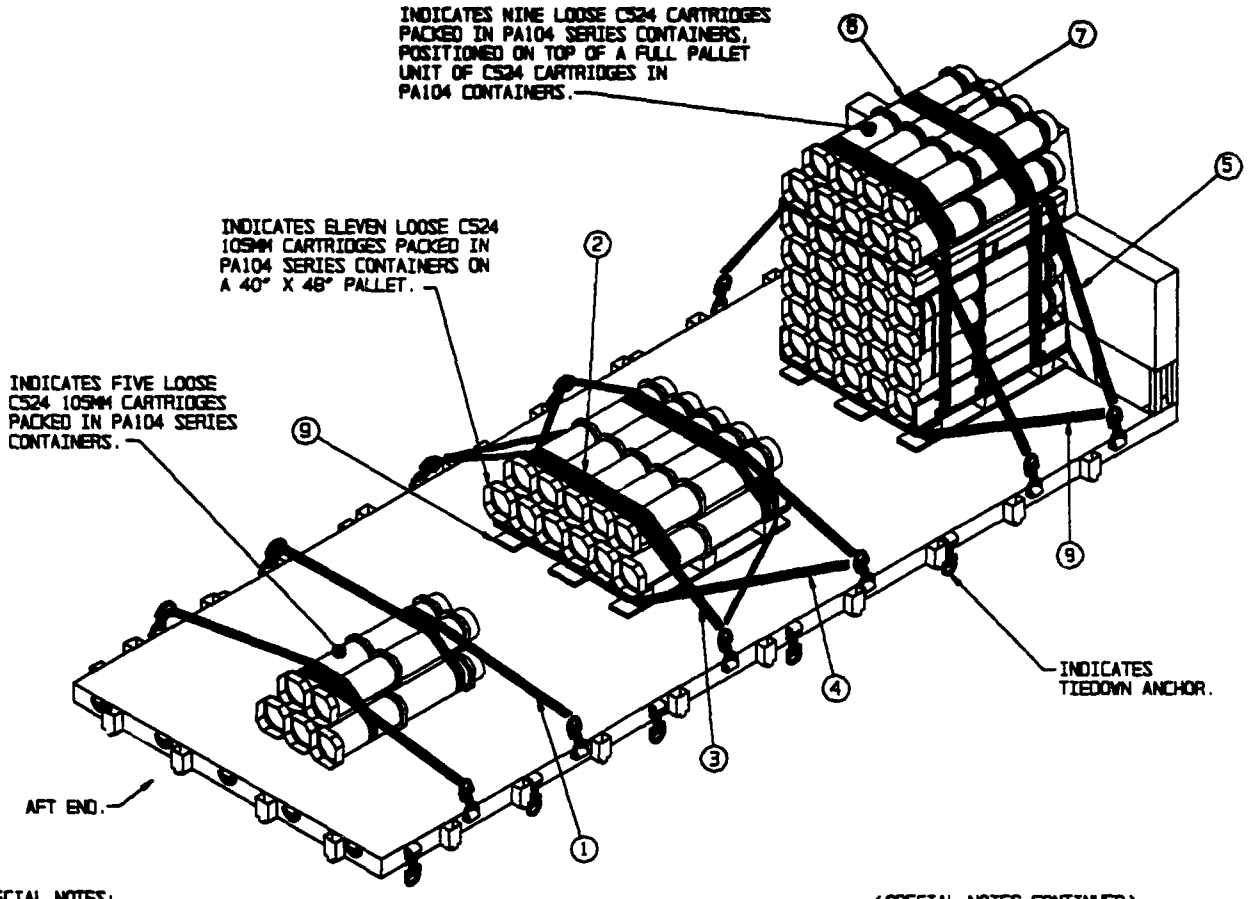
⑥ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PROPELLING CHARGE CONTAINER BUNDLE, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP SLACK IN STRAP AND RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑦ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO ENCIRCLE PALLET MARKED ⑩ AND ALL LOOSE PROPELLING CHARGE CONTAINERS POSITIONED ON THE PALLET. PRIOR TO POSITIONING CONTAINERS ON THE PALLET, THREAD STRAPS MARKED ⑦ UNDER THE TOP DECK OF THE PALLET WITH BOTH RATCHET ENDS ON THE SAME SIDE OF THE PALLET. MAKE SURE THAT STRAPS LAY FLAT WITH NO TWISTS IN THEM. POSITION THE FIRST LAYER OF PROPELLING CHARGE CONTAINERS ON THE PALLET, WITH ENDS ALTERNATED. ADJUST THE TWO STRAPS MARKED ⑦ SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE ROLLING FLANGE ON THE OPPOSITE END OF THE CONTAINERS. KEEP THE BOTTOM LAYER CONTAINERS TIGHT AGAINST EACH OTHER AND STACK THE REMAINING CONTAINERS, IN LAYERS, WITH THE ENDS ALTERNATED, ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, BRING ENDS OF STRAPS UP OVER TOP OF CONTAINERS AND HOOK ENDS OF STRAP TOGETHER. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. NOTE: AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS SO THEY FORM A TIGHT BUNDLE ON THE PALLET. THE CONTAINERS MAY SEEK THEIR NATURAL POSITION DURING TRANSPORT, IF SO, CHECK STRAPS FOR TIGHTNESS AND RE-TIGHTEN IF NECESSARY. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑧ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PROPELLING CHARGE CONTAINERS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH RATCHETS ON THE SAME SIDE OF THE FLATRACK. ATTACH WEB STRAP TIEDOWN ASSEMBLY MARKED ⑨ TO THE TIEDOWN ANCHOR PRIOR TO RATCHETING WEB STRAP TIEDOWN ASSEMBLIES MARKED ⑧ TIGHT. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS MARKED ⑧ AT THE SAME TIME. NOTE: THESE STRAPS SHOULD ALWAYS BE POSITIONED BETWEEN THE BELL ON ONE END OF A CONTAINER AND THE ROLLING FLANGE ON THE OPPOSITE END OF THE SAME CONTAINER. DUE TO LOCATION OF TIEDOWN ANCHORS, IT MAY BE NECESSARY TO ANGLE THESE STRAPS SLIGHTLY TO MEET THIS REQUIREMENT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑨ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PROPELLING CHARGE CONTAINERS AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP SLACK IN STRAP AND RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑩ WOOD PALLET 40" X 48" (1 REQD). SEE KEY NUMBER ⑦ ABOVE.



SPECIAL NOTES:

1. TYPICAL METHODS OF SECURING LOOSE CARTRIDGE CONTAINERS ON TOP OF A PALLETIZED UNIT, ON THE FLOOR OF THE FLATRACK, AND ON A 40" X 48" PALLET, ARE SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. THE PROCEDURES FOR SECURING LOOSE 105MM AND/OR 120MM CARTRIDGE CONTAINERS SHOWN ON THIS PAGE MAY ALSO BE USED FOR THE M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE 105MM CARTRIDGE PACKED IN THE P104 SERIES CONTAINER HAVING DIMENSIONS OF 45-5/8" LONG BY 7-1/8" WIDE BY 7-1/8" HIGH WITH STACKING LUGS LOCATED ON THE BELL AT THE OPENING END AND THE COLLAR AT THE OPPOSITE END IS SHOWN. THESE PROCEDURES MAY BE USED FOR SIMILAR CONTAINERS OF DIFFERENT SIZES AND WEIGHTS.

4. GUIDANCE FOR LOADING LOOSE CONTAINERS THAT HAVE STACKING LUGS LOCATED ON THE BELL AT THE OPENING END AND THE COLLAR AT THE OPPOSITE END, SUCH AS THE PA104 SERIES CONTAINER:

   A. WHEN LOADING TWO CONTAINERS, SIDE-BY-SIDE, POSITION THE STACKING LUG ON THE SIDE SO IT LOCKS INTO THE STACKING LUG RETAINING HOLE ON THE ADJACENT CONTAINER. USE THIS PROCEDURE WHEN LOADING TWO THRU FIVE CONTAINERS SIDE-BY-SIDE ON THE FLATRACK FLOOR, ON A PALLET, OR ON TOP OF A PALLETIZED UNIT.

   B. THREE OR MORE CONTAINERS CAN BE POSITIONED IN LAYERS AS SHOWN FOR THE FIVE CONTAINER BUNDLE ON THE FLOOR. POSITION THE STACKING LUGS ON THE SIDE OF THE CONTAINERS IN THE BOTTOM LAYER SO THEY LOCK INTO THE STACKING LUG RETAINING HOLE ON THE ADJACENT CONTAINER. POSITION THE SECOND LAYER CONTAINERS IN SUCH A MANNER THAT THE BELL IS LOCATED BEHIND AND BUTTED AGAINST THE BELL ON THE BOTTOM LAYER CONTAINERS. THIS WILL PREVENT THE SECOND LAYER CONTAINERS FROM SLIPPING OFF THE FIRST LAYER CONTAINER BELLS DURING TRANSIT. POSITION THE

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(SPECIAL NOTES CONTINUED)

STACKING LUGS ON THE CONTAINERS IN THE SECOND LAYER SO THEY LOCK INTO THE STACKING LUG RETAINING HOLE ON THE ADJACENT CONTAINER. POSITION THE CONTAINERS IN THE SECOND LAYER TO CENTER ON THE JOINTS BETWEEN THE CONTAINERS IN THE BOTTOM LAYER. USE THIS METHOD WHEN LOADING CONTAINERS ON ALL PALLETS, ON THE FLATRACK FLOOR, OR ON TOP OF A PALLETIZED UNIT.

5. WOOD PALLETS HAVING DIMENSIONS OF 40" X 48" ARE SHOWN IN THE LOAD ABOVE. HOWEVER, THE METHODS SHOWN MAY BE USED FOR WOOD PALLETS OF OTHER DIMENSIONS AND/OR METAL PALLETS.

6. THE QUANTITY OF CONTAINERS WITHIN A BUNDLE IS LIMITED TO THE QUANTITY THAT CAN BE ENCIRCLED WITH ONE WEB STRAP TIEDOWN ASSEMBLY, SHOWN AS KEY NUMBER ⑥ ABOVE.

7. IF THE BUNDLE OF CONTAINERS LOADED ON A 40" X 48" PALLET DOES NOT OVERHANG THE PALLET ON EACH SIDE, TWO ADDITIONAL STRAPS ARE REQUIRED. INSTALL THESE TWO STRAPS TO ENCIRCLE THE LOOSE CONTAINERS AT TWO LOCATIONS. SEE KEY NUMBER ⑥ ON PAGE 35 FOR GUIDANCE.

8. HOLD-DOWN STRAPS MARKED ⑤ ARE POSITIONED OVER TOP OF THE PALLETIZED UNIT AND MUST NOT BE POSITIONED OVER TOP OF THE LOOSE CONTAINERS ON TOP OF A PALLETIZED UNIT. SEE KEY NUMBERS ⑤ THRU ⑧ ON PAGE 35 FOR GUIDANCE WHEN LOADING LOOSE CONTAINERS ON TOP OF PALLETIZED UNITS.

9. THE QUANTITY OF LOOSE CONTAINERS POSITIONED ON TOP OF A PALLETIZED UNIT IS ONE CONTAINER UP TO A MAXIMUM OF TWO FULL LAYERS OF CONTAINERS. SEE SPECIAL NOTE 10 ON THIS PAGE.

10. WHEN LOADING LOOSE CONTAINERS ALWAYS POSITION ALL CONTAINERS WITH THE OPENING ENDS POINTING IN THE SAME DIRECTION.

11. IF LOADING ONE THRU FIVE CONTAINERS ON TOP OF A PALLET UNIT, OMIT STRAPS MARKED ⑤.

KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF THREE TO FIVE LOOSE CONTAINERS). INSTALL EACH STRAP TO ENCIRCLE ALL CONTAINERS IN THE BUNDLE. PRE-POSITION THESE TWO STRAPS ON THE FLOOR OF THE FLATRACK, IN LINE WITH THE TIEDOWN ANCHORS TO BE USED, PRIOR TO LOADING THE CONTAINERS. MAKE SURE THE STRAPS LAY FLAT ACROSS THE FLOOR, WITH THE RATCHET HANDLE FACING DOWN, AND DRAPE THE ENDS OVER THE SIDE OF THE FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. POSITION TWO THRU FIVE LOOSE CONTAINERS ON THE FLOOR AND CENTERED OVER TOP OF BOTH STRAPS. WHILE HOLDING CONTAINERS IN POSITION, BRING EACH END OF STRAP UP, CROSS ENDS OVER TOP OF BUNDLE, AND ATTACH ENDS OF STRAP TO TIEDOWN ANCHORS ON OPPOSITE SIDES OF THE FLATRACK. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS, IF NECESSARY SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

② WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE LOOSE CONTAINERS). INSTALL EACH STRAP TO ENCIRCLE ALL CONTAINERS AND TOP DECK OF PALLET. PRIOR TO POSITIONING CONTAINERS ON PALLET, THREAD STRAPS MARKED ② UNDER TOP DECK OF PALLET WITH BOTH RATCHET ENDS ON SAME SIDE OF PALLET. MAKE SURE STRAPS LAY FLAT WITH NO TWISTS IN THEM. AFTER THE CONTAINERS ARE POSITIONED ON THE PALLET, BRING ENDS OF STRAPS UP OVER TOP OF CONTAINERS AND HOOK ENDS OF STRAP TOGETHER. ADJUST STRAPS SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF CONTAINERS. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF CONTAINERS SECURED ON A PALLET). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF CONTAINERS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. ATTACH WEB STRAP TIEDOWN ASSEMBLIES MARKED ④ TO THE SAME TIEDOWN ANCHORS PRIOR TO RATCHETING STRAPS MARKED ③ TIGHT. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS MARKED ③ AT THE SAME TIME. NOTE: THE CONTAINERS SHOULD BE POSITIONED SO STRAPS MARKED ③ WILL GO STRAIGHT OVER THE TOP OF THE BUNDLE AND BE BETWEEN THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINER, DUE TO LOCATION AND QUANTITY OF TIEDOWN ANCHORS, IT MAY BE NECESSARY TO ANGLE THESE STRAPS SLIGHTLY TO MEET THIS REQUIREMENT. SEE GENERAL NOTES "F", "G", AND "N" ON PAGE 2.

④ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH PALLET). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PALLET AT EACH LOCATION SHOWN, TO A TIEDOWN ANCHOR ON THE OPPOSITE SIDE OF THE FLATRACK. IF THESE STRAPS ARE BEING ATTACHED TO THE SAME TIEDOWN ANCHORS AS STRAPS MARKED ③, ATTACH RATCHET ENDS TO THE SAME TIEDOWN ANCHORS THAT THE NON-RATCHET ENDS OF STRAPS MARKED ③ ARE ATTACHED TO. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT. SEE GENERAL NOTES "F", "G", AND "N" ON PAGE 2.

⑤ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, OVER TOP OF PALLETIZED UNIT, UNDER ALL LOOSE CONTAINERS WHICH ARE POSITIONED ON TOP OF THE PALLETIZED UNIT, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. NOTE: STRAPS MARKED ⑤ MUST BE INSTALLED OVER TOP OF THE PALLETIZED UNIT PRIOR TO POSITIONING THE LOOSE CONTAINERS ON TOP OF THE PALLETIZED UNIT. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

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(KEY NUMBERS CONTINUED)

⑥ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE LOOSE COMPLETE ROUND CONTAINERS). INSTALL EACH STRAP TO ENCIRCLE ALL CONTAINERS IN THE BUNDLE AT THE APPROXIMATE LOCATION SHOWN. PRE-POSITION THESE TWO STRAPS ON TOP OF THE PALLETIZED UNIT PRIOR TO LOADING CONTAINERS. MAKE SURE STRAPS LAY FLAT AND DRAPE THE ENDS OVER THE SIDE OF THE PALLETIZED UNIT. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE PALLETIZED UNIT. POSITION THE FIRST LAYER OF CONTAINERS ON TOP OF THE PALLETIZED UNIT AND ADJUST THE STRAPS SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINER. KEEP THE BOTTOM LAYER OF CONTAINERS TIGHT AGAINST EACH OTHER AND STACK THE REMAINING CONTAINERS ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, HOOK END OF STRAPS MARKED ⑥ TOGETHER AND POSITION ON TOP OF BUNDLE. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED MAKE POSITION ADJUSTMENTS TO THE CONTAINERS, IF NECESSARY, SO THEY FORM A COMPACT TIGHT BUNDLE. SEE SPECIAL NOTE 11 ON PAGE 34 AND GENERAL NOTES "F" AND "G" ON PAGE 2.

⑦ WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO ENCIRCLE PALLETIZED UNIT AND ALL LOOSE CONTAINERS POSITIONED ON TOP OF THE PALLETIZED UNIT. PRIOR TO POSITIONING LOOSE CONTAINERS ON THE PALLETIZED UNIT, THREAD STRAPS MARKED ⑦ UNDER THE TOP DECK OF THE PALLET WITH BOTH RATCHET ENDS ON THE SAME SIDE OF THE PALLET. MAKE SURE THAT THE STRAPS LAY FLAT WITH NO TWISTS IN THEM. POSITION THE LOOSE CONTAINERS ON TOP OF THE PALLETIZED UNIT. ADJUST THE TWO STRAPS MARKED ⑦ SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINERS. BRING ENDS OF STRAPS UP OVER TOP OF LOOSE CONTAINERS AND HOOK ENDS OF STRAP TOGETHER. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

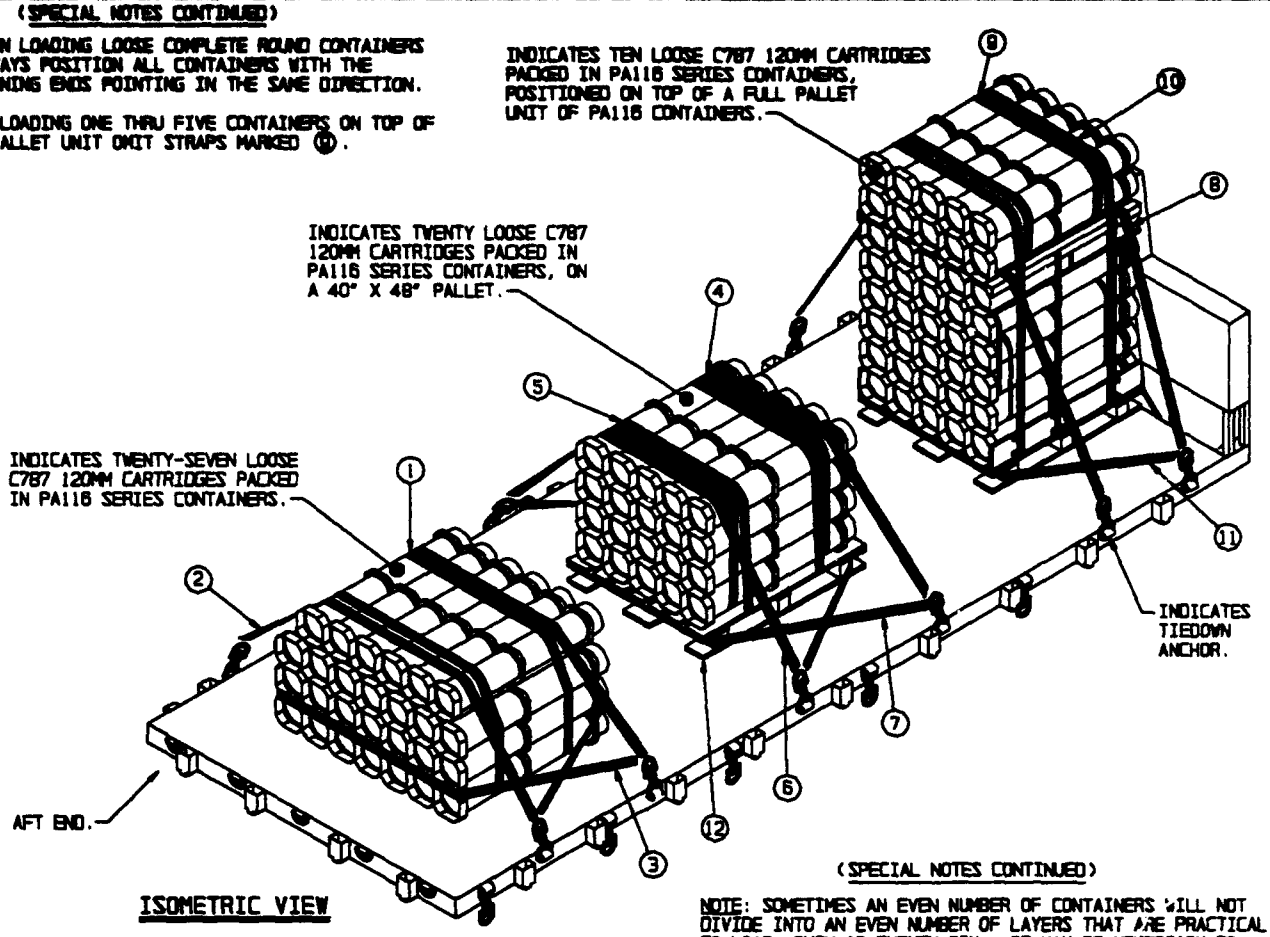
⑧ WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PALLET AS SHOWN, TO A TIEDOWN ANCHOR ON THE OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F", "G" AND "N" ON PAGE 2.

⑨ WOOD PALLET 40" X 48" (1 REQD). SEE KEY NUMBER ② ABOVE.

(SPECIAL NOTES CONTINUED)

9. WHEN LOADING LOOSE COMPLETE ROUND CONTAINERS ALWAYS POSITION ALL CONTAINERS WITH THE OPENING ENDS POINTING IN THE SAME DIRECTION.

10. IF LOADING ONE THRU FIVE CONTAINERS ON TOP OF A PALLET UNIT OMIT STRAPS MARKED ⑧.



ISOMETRIC VIEW

SPECIAL NOTES:

1. TYPICAL METHODS OF SECURING LOOSE CARTRIDGE CONTAINERS ON TOP OF A PALLETIZED UNIT, ON THE FLOOR OF THE FLATRACK, AND ON A 40" X 48" PALLET, ARE SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. THE PROCEDURES FOR SECURING LOOSE 120MM CARTRIDGE CONTAINERS SHOWN ON THIS PAGE MAY ALSO BE USED ON THE M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE 2.

3. THE 120MM CARTRIDGE PACKED IN THE PA116 SERIES CONTAINER, HAVING DIMENSIONS OF 44-1/2" LONG BY 7-3/4" WIDE BY 7-3/4" HIGH WITH STACKING LUGS LOCATED ON THE BELL AT THE OPENING END AND THE COLLAR AT THE OPPOSITE END AND ALSO HAVING RING INTERLOCKS LOCATED ON THE CENTER COLLAR AND THE COLLAR ON THE NON-OPENING END, IS SHOWN. THESE PROCEDURES MAY BE USED FOR SIMILAR COMPLETE ROUND CONTAINERS OF DIFFERENT SIZES AND WEIGHTS.

4. GUIDANCE FOR LOADING LOOSE CONTAINERS THAT HAVE STACKING LUGS LOCATED ON THE BELL AT THE OPENING END AND THE COLLAR AT THE OPPOSITE END, AND RING INTERLOCKS LOCATED ON THE CENTER COLLAR AND THE COLLAR ON THE NON-OPENING END, SUCH AS THE PA116 SERIES CONTAINERS FOLLOWS:

   A. WHEN LOADING TWO OR THREE CONTAINERS SIDE-BY-SIDE, POSITION THE STACKING LUG ON THE SIDE SO IT LOCKS INTO THE STACKING LUG RETAINING HOLE ON THE ADJACENT CONTAINER. USE THIS PROCEDURE WHEN LOADING TWO OR THREE CONTAINERS ON THE FLATRACK FLOOR, ON A PALLET, OR ON TOP OF A PALLETIZED UNIT.

   B. WHEN LOADING AN EVEN NUMBER OF CONTAINERS SUCH AS FOUR, SIX OR TWENTY-FOUR, POSITION IN EVEN ROWS AND STACK AS SHOWN FOR THE TWENTY CONTAINER BUNDLE OF PA116 SERIES CONTAINERS ON THIS PAGE. POSITION IN EVEN NUMBER LAYERS WITH THE STACKING LUGS ON TOP SO THEY LOCK INTO THE STACKING LUG CONTAINER HOLE ON THE TOP CONTAINER. ALSO, THE RING INTERLOCKS MUST BE "ENGAGED" WITH THE RING INTERLOCKS ON ADJACENT CONTAINERS. USE THIS METHOD WHEN LOADING AN EVEN NUMBER OF CONTAINERS ON A PALLET, ON THE FLATRACK FLOOR, OR ON TOP OF A PALLETIZED UNIT.

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(SPECIAL NOTES CONTINUED)

NOTE: SOMETIMES AN EVEN NUMBER OF CONTAINERS WILL NOT DIVIDE INTO AN EVEN NUMBER OF LAYERS THAT ARE PRACTICAL TO LOAD, SUCH AS TWENTY-SIX. IT MAY BE NECESSARY TO FABRICATE ONE BUNDLE OF EIGHTEEN CONTAINERS (THREE LAYERS OF SIX CONTAINERS EACH) AND ONE BUNDLE OF EIGHT CONTAINERS (TWO LAYERS OF FOUR CONTAINERS EACH).

   C. WHEN LOADING AN UNEVEN NUMBER OF CONTAINERS SUCH AS TWENTY-SEVEN, FABRICATE A BUNDLE HAVING AT LEAST FOUR LAYERS OF WHICH THE BOTTOM THREE LAYERS WOULD HAVE THE SAME QUANTITY OF CONTAINERS PER EACH LAYER AND THE TOP LAYER WOULD HAVE ONE LESS CONTAINER, AS SHOWN ON THIS PAGE. NOTE: WHEN FABRICATING A BUNDLE HAVING AN UNEVEN NUMBER OF CONTAINERS, THE TOP LAYER CAN ONLY HAVE ONE LESS CONTAINER THAN THE BOTTOM LAYERS. FOLLOW THE INSTRUCTIONS IN SPECIAL NOTE 3 B ON THIS PAGE WHEN LOADING THE FIRST THREE LAYERS OF SEVEN CONTAINERS EACH. WHEN LOADING THE TOP LAYER OF SIX CONTAINERS POSITION THE SECOND LAYER TO CENTER ON THE JOINTS BETWEEN THE CONTAINERS IN THE THIRD LAYER AND IN SUCH A MANNER THAT THE BELL IS LOCATED BEHIND AND BUTTED AGAINST THE BELLS ON THE THIRD LAYER CONTAINERS. THIS WILL PREVENT THE TOP LAYER CONTAINER BELLS FROM SLIPPING OFF THE FIST LAYER CONTAINER BELLS DURING TRANSIT. POSITION THE STACKING LUGS ON THE SIDE OF THE CONTAINERS IN THE TOP LAYER SO THEY LOCK INTO THE STACKING LUG RETAINING HOLE ON ADJACENT CONTAINERS. USE THIS METHOD WHEN LOADING AN UNEVEN NUMBER OF CONTAINERS ON A PALLET, ON THE VEHICLE FLOOR, OR ON TOP OF A PALLETIZED UNIT.

5. WOOD PALLETS HAVING DIMENSIONS OF 40" X 48" ARE SHOWN IN THE LOAD ABOVE. HOWEVER, THE METHOD SHOWN MAY BE USED FOR WOOD PALLETS OF OTHER DIMENSIONS AND/OR METAL PALLETS.

6. THE QUANTITY OF CONTAINERS WITHIN A BUNDLE IS LIMITED TO THE QUANTITY THAT CAN BE ENCIRCLED WITH ONE WEB STRAP TIEDOWN ASSEMBLY, SHOWN AS KEY NUMBER ① ABOVE.

7. HOLD-DOWN STRAPS MARKED ⑧ ARE POSITIONED OVER TOP OF THE PALLETIZED UNIT AND MUST NOT BE POSITIONED OVER TOP OF THE LOOSE CONTAINERS ON TOP OF A PALLETIZED UNIT. SEE KEY NUMBERS ⑧ THRU ⑫ ON PAGE 37 FOR GUIDANCE WHEN LOADING LOOSE CONTAINERS ON TOP OF PALLETIZED UNITS.

8. THE QUANTITY OF LOOSE CONTAINERS POSITIONED ON TOP OF A PALLETIZED UNIT IS ONE CONTAINER UP TO A MAXIMUM OF TWO FULL LAYERS OF CONTAINERS.

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KEY NUMBERS

① WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE LOOSE CONTAINERS). INSTALL EACH STRAP TO ENCIRCLE ALL CONTAINERS IN THE BUNDLE AT THE APPROXIMATE LOCATION SHOWN. PRE-POSITION THESE TWO STRAPS ON THE FLOOR OF THE FLATRACK, PRIOR TO LOADING THE CONTAINERS. MAKE SURE THE STRAPS LAY FLAT ACROSS THE FLOOR AND DRAPE THE ENDS OVER THE SIDE OF THE FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. POSITION THE FIRST LAYER OF CONTAINERS ON THE FLOOR AND ADJUST THE TWO STRAPS SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND COLLAR ON THE OPPOSITE END OF THE CONTAINER. KEEP THE BOTTOM LAYER OF CONTAINERS TIGHT AGAINST EACH OTHER AND STACK THE REMAINING CONTAINERS IN LAYERS ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, HOOK ENDS OF EACH STRAP MARKED ① TOGETHER AND POSITION ON TOP OF BUNDLE. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS, IF NECESSARY, SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

② WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE LOOSE CONTAINERS). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK , OVER TOP OF CONTAINERS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. ATTACH WEB STRAP TIEDOWN ASSEMBLIES, MARKED ③ TO THE SAME TIEDOWN ANCHORS PRIOR TO RATCHETING STRAPS MARKED ② TIGHT. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS MARKED ② AT THE SAME TIME. NOTE: THE CONTAINERS SHOULD BE POSITIONED SO STRAPS MARKED ② WILL GO STRAIGHT OVER THE TOP OF THE BUNDLE AND BE BETWEEN THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINER. DUE TO LOCATION AND QUANTITY OF TIEDOWN ANCHORS, IT MAY BE NECESSARY TO ANGLE STRAPS SLIGHTLY TO MEET THIS REQUIREMENT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

③ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE LOOSE CONTAINERS). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF BUNDLED CONTAINERS AT LOCATION SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. IF THESE STRAPS ARE BEING ATTACHED TO THE SAME TIEDOWN ANCHOR AS STRAPS MARKED ②, ATTACH RATCHET ENDS TO THE SAME TIEDOWN ANCHORS THAT THE NON-RATCHET ENDS OF STRAPS MARKED ② ARE ATTACHED TO. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT. SEE GENERAL NOTES "F", "G", AND "N" ON PAGE 2.

④ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE CONTAINERS). INSTALL EACH STRAP TO ENCIRCLE ALL CONTAINERS IN THE BUNDLE AT THE APPROXIMATE LOCATION SHOWN. PRE-POSITION THESE TWO STRAPS ON THE PALLET PRIOR TO LOADING CONTAINERS. MAKE SURE STRAPS LAY FLAT ACROSS THE PALLET AND DRAPE THE ENDS OVER THE SIDE OF THE PALLET. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE PALLET. POSITION THE FIRST LAYER OF CONTAINERS ON THE PALLET AND ADJUST THE TWO STRAPS SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINER. KEEP THE BOTTOM LAYER OF CONTAINERS TIGHT AGAINST EACH OTHER AND STACK THE REMAINING CONTAINERS IN LAYERS ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, HOOK ENDS OF EACH STRAP MARKED ④ TOGETHER AND POSITION ON TOP OF BUNDLE. TAKE UP EXCESS SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS, IF NECESSARY, SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑤ WEB STRAP TIEDOWN ASSEMBLY (TWO REQD FOR EACH BUNDLE OF SIX OR MORE LOOSE CONTAINERS). INSTALL EACH STRAP TO ENCIRCLE ALL CONTAINERS AND TOP DECK OF PALLET. PRIOR TO POSITIONING CONTAINERS ON PALLET, THREAD STRAPS MARKED ⑤ UNDER THE TOP DECK OF THE PALLET WITH BOTH RATCHET ENDS ON THE SAME SIDE OF PALLET. MAKE SURE THE STRAPS LAY FLAT WITH NO TWISTS IN THEM. AFTER THE CONTAINERS ARE POSITIONED ON THE PALLET, BRING ENDS OF STRAPS UP OVER TOP OF CONTAINERS AND HOOK ENDS OF STRAP TOGETHER. ADJUST STRAPS SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF CONTAINERS. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑥ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF CONTAINERS SECURED ON A PALLET). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK OVER TOP OF

(CONTINUED AT RIGHT)

(KEY NUMBERS CONTINUED)

CONTAINERS, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE FLATRACK. ATTACH WEB STRAP TIEDOWN ASSEMBLIES MARKED ⑦ TO THE SAME TIEDOWN ANCHORS PRIOR TO RATCHETING STRAPS MARKED ⑥ TIGHT. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS MARKED ⑥ AT THE SAME TIME. NOTE: THE CONTAINERS SHOULD BE POSITIONED SO STRAPS MARKED ⑥ WILL GO STRAIGHT OVER THE TOP OF THE BUNDLE AND BE BETWEEN THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINER. DUE TO LOCATION AND QUANTITY OF TIEDOWN ANCHORS, IT MAY BE NECESSARY TO ANGLE THESE STRAPS SLIGHTLY TO MEET THIS REQUIREMENT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑦ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED PER PALLET). INSTALL EACH STRAP FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PALLET AT LOCATION SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. IF THESE STRAPS ARE BEING ATTACHED TO THE SAME TIEDOWN ANCHORS AS STRAPS MARKED ⑥, ATTACH RATCHET ENDS TO THE SAME TIEDOWN ANCHORS THAT THE NON-RATCHET ENDS OF STRAPS, MARKED ⑥ ARE ATTACHED TO. TAKE UP SLACK IN STRAPS AND RATCHET TIGHT. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

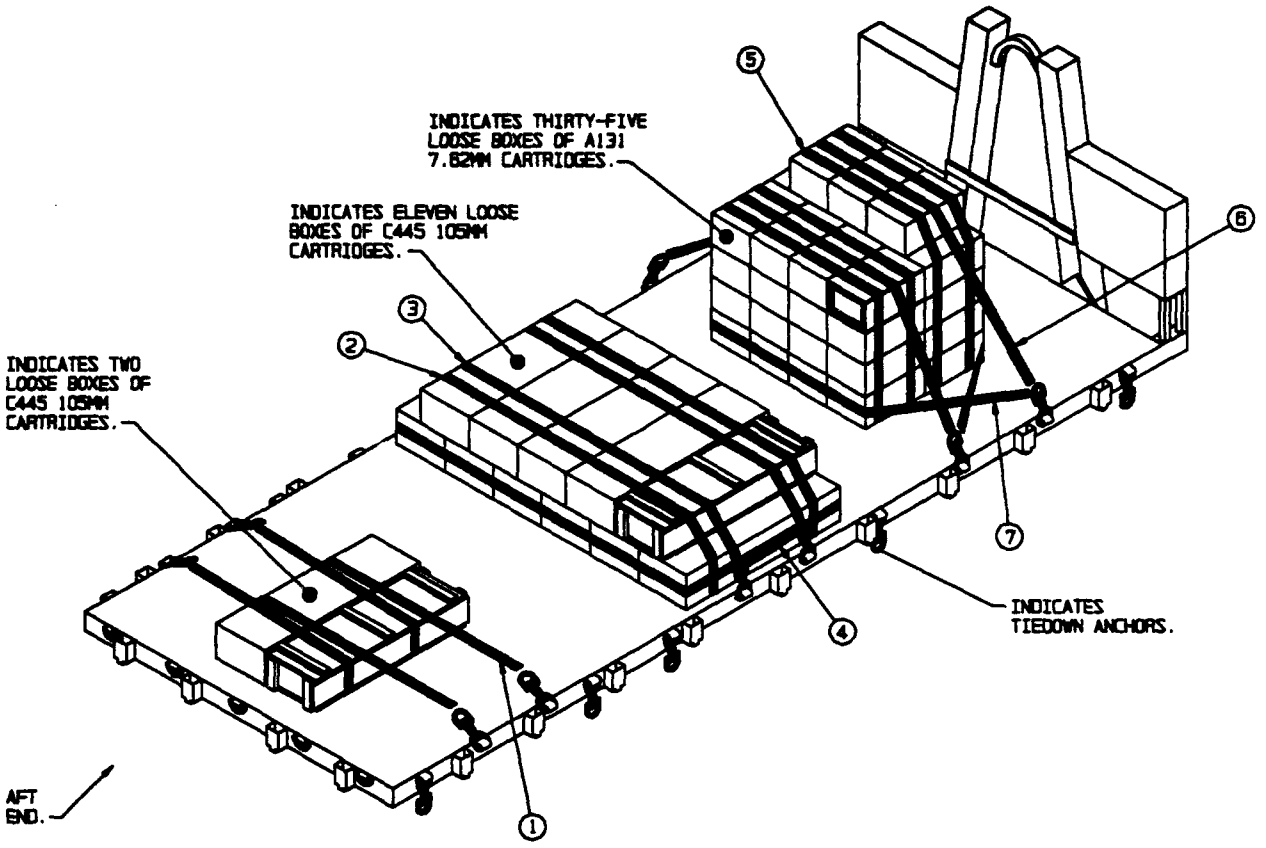
⑧ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED OVER TOP OF EACH PALLETIZED UNIT). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK OVER TOP OF PALLETIZED UNIT, UNDER ALL LOOSE CONTAINERS WHICH ARE POSITIONED ON TOP OF THE PALLETIZED UNIT, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT. NOTE: STRAPS MARKED ⑧ MUST BE INSTALLED OVER TOP OF THE PALLETIZED UNIT PRIOR TO POSITIONING THE LOOSE CONTAINERS ON TOP OF THE PALLETIZED UNIT. TAKE UP EXCESS SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑨ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE LOOSE CONTAINERS). INSTALL EACH STRAP TO ENCIRCLE ALL CONTAINERS IN THE BUNDLE AT THE APPROXIMATE LOCATION SHOWN. PRE-POSITION THESE TWO STRAPS ON TOP OF THE PALLETIZED UNIT PRIOR TO LOADING CONTAINERS. MAKE SURE STRAPS LAY FLAT AND DRAPE THE ENDS OVER THE SIDE OF THE PALLETIZED UNIT. POSITION BOTH STRAP RATCHETS ON THE SAME SIDE OF THE PALLETIZED UNIT. POSITION THE FIRST LAYER OF CONTAINERS ON TOP OF THE PALLETIZED UNIT AND ADJUST THE STRAPS SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINER. KEEP THE BOTTOM LAYER OF CONTAINERS TIGHT AGAINST EACH OTHER AND STACK THE REMAINING CONTAINERS ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, HOOK ENDS OF EACH STRAP MARKED ⑨ TOGETHER AND POSITION ON TOP OF BUNDLE. TAKE UP SLACK IN STRAPS AND THEN RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS, IF NECESSARY, SO THEY FORM A COMPACT TIGHT BUNDLE. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑩ WEB STRAP TIEDOWN ASSEMBLY (TWO REQUIRED FOR EACH BUNDLE OF SIX OR MORE CONTAINERS POSITIONED ON TOP OF A PALLET UNIT). INSTALL EACH STRAP TO ENCIRCLE PALLETIZED UNIT AND ALL LOOSE CONTAINERS POSITIONED ON TOP OF THE PALLETIZED UNIT. PRIOR TO POSITIONING LOOSE CONTAINERS ON THE PALLETIZED UNIT, THREAD STRAPS MARKED ⑩ UNDER THE TOP DECK OF THE PALLET WITH BOTH RATCHET ENDS ON THE SAME SIDE OF THE PALLET. MAKE SURE THAT THE STRAPS LAY FLAT WITH NO TWISTS IN THEM. POSITION THE FIRST LAYER OF CONTAINERS ON TOP OF THE PALLETIZED UNIT. ADJUST THE TWO STRAPS MARKED ⑩ SO THEY WILL BE CLOSE TO THE BELL ON ONE END AND THE COLLAR ON THE OPPOSITE END OF THE CONTAINER. KEEP THE BOTTOM LAYER OF CONTAINERS TIGHT AGAINST EACH OTHER AND STACK THE REMAINING CONTAINERS ON TOP OF THE BOTTOM LAYER. AFTER ALL CONTAINERS ARE STACKED, BRING ENDS OF STRAPS UP OVER TOP OF LOOSE CONTAINERS AND HOOK ENDS OF STRAPS TOGETHER. TAKE UP EXCESS SLACK IN STRAPS AND RATCHET TIGHT BOTH STRAPS AT THE SAME TIME. NOTE: AS THE STRAPS ARE BEING TIGHTENED, MAKE POSITION ADJUSTMENTS TO THE CONTAINERS SO THEY FORM A TIGHT BUNDLE ON TOP OF THE PALLETIZED UNIT. SINCE THE CONTAINERS MAY SEEK THEIR NATURAL POSITION DURING TRANSPORT, CHECK STRAPS FOR TIGHTNESS AND RE-TIGHTEN IF NECESSARY. SEE GENERAL NOTES "F" AND "G" ON PAGE 2.

⑪ WEB STRAP TIEDOWN ASSEMBLY (ONE REQUIRED). INSTALL STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF FLATRACK, AROUND END OF PALLET AS SHOWN, TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF FLATRACK. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "F", "G" AND "N" ON PAGE 2.

⑫ WOOD PALLET, 40" X 48" (1 REQD). SEE KEY NUMBER ⑤ ON THIS PAGE.



ISOMETRIC VIEW

SPECIAL NOTES:

1. TYPICAL METHODS OF SECURING LOOSE BOXES ON THE FLOOR OF THE FLATRACK ARE SHOWN LOADED ON THE A-FRAME FLATRACK HAVING CARGO DECK DIMENSIONS OF 7'-6-1/2" WIDE BY 19'-0" LONG AND A MAXIMUM LOAD WEIGHT OF 33,000 POUNDS.

2. THE PROCEDURES FOR SECURING LOOSE 7.62MM OR 105MM CARTRIDGE WOODEN BOXES SHOWN ON THIS PAGE MAY ALSO BE USED ON THE M1 FLATRACK. SEE GENERAL NOTE "C" ON PAGE .

3. THE 105MM CARTRIDGE, PACKED TWO PER WOODEN BOX HAVING DIMENSIONS OF 45-3/4" LONG BY 14-1/4" WIDE BY 8-3/4" HIGH AND THE 7.62MM CARTRIDGE, PACKED 800 PER WOODEN BOX AND HAVING DIMENSIONS OF 17-1/2" LONG BY 11-1/2" WIDE BY 8-1/8" HIGH, ARE SHOWN. THESE PROCEDURES MAY BE USED FOR BOXES OF DIFFERENT SIZES AND WEIGHTS.

4. THE QUANTITY OF BOXES WITHIN A BUNDLE IS LIMITED TO THE QUANTITY THAT CAN BE ENCIRCLED WITH ONE WEB STRAP TIEDOWN ASSEMBLY, SHOWN AS KEY NUMBERS ② AND ⑤ ABOVE.

5. FOR ALTERNATIVE METHODS OF SECURING LOOSE BOXES, SEE PAGES 40 AND 41.

7.62MM AND 105MM CARTRIDGES IN WOODEN BOXES